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14. ABSTRACT
The 97 CES at Altus AFB is planning future installation development based upon the Capital Improvements Program (CIP) contained within the current Altus AFB General Plan (General Plan). The purpose of the proposed and alternative actions is to construct, renovate demolish, and operate facilities and infrastructure to support current and potential future training levels at Altus AFB and to improve the effectiveness of training; enhance quality of life; replace old, inadequate facilities; and correct current deficiencies. The proposed and alternative actions provide a range of construction, renovation, and demolition scenarios so that a comparison can be made of the impacts from the status quo, implementation of the CIP and related mission projects, and construction and demolition of the installation to a substantially higher level of mission activity. There would be no new missions, personnel or aircraft assigned to Altus AFB as a result of the Proposed Action. The Air Force proposes to implement the CIP projects identified in the General Plan and other mission activities in support of the ongoing mission at Altus AFB including establishing a closed traffic pattern on the west side of Altus AFB as a part of regular flight operations. The Potential Development Alternative (PDA) represents a broader approach to installation and mission development at Altus AFB. The PDA would incorporate the west closed traffic pattern, construction and demolition activities defined in the Proposed Action, as well as broader installation expansion. Under the PDA, approximately 384 acres of land would be developed at Altus AFB. This would represent development of approximately 75 percent of the developable land on Altus AFB. The PDA would also result in an additional 426 personnel and dependents at Altus AFB. Under the No-action Alternative, there would be no construction renovation, or demolition activities at Altus AFB. The following resources were identified for study in this EA: Airspace Use and Management Noise, Land Use, Air Quality, Earth Resources, Biological Resources, Cultural Resources, Water Resources, Hazardous Materials and Wastes, Safety, Infrastructure and Utilities, Socioeconomic Resources, and Environmental Justice.

15. SUBJECT TERMS

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FINDING OF NO SIGNIFICANT IMPACT
FINDING OF NO PRACTICABLE ALTERNATIVE

ENVIRONMENTAL ASSESSMENT
GENERAL PLAN-BASED ENVIROMENTAL IMPACT ANALYSIS PROCESS

ALTUS AIR FORCE BASE, OKLAHOMA

AGENCY: 97th Civil Engineer Squadron (97 CES), Altus Air Force Base (AFB), Oklahoma.

BACKGROUND: The 97 CES at Altus AFB has prepared an environmental assessment (EA) based on the installation's General Plan and Capital Improvements Program (CIP) requirements. This EA has been accomplished pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations implementing the NEPA, 40 Code of Federal Regulations (CFR) Sections 1500-1508 *Regulations for Implementing NEPA*, and 32 CFR Part 989 *Environmental Impact Analysis Process*.

PROPOSED ACTION: The Air Force proposes to implement future installation development based upon the CIP contained within the current *Altus AFB General Plan* (General Plan). The Proposed Action will construct approximately 235,734 square feet of new facilities, demolish approximately 119,617 square feet, and renovate approximately 36,541,720 square feet of existing facilities and infrastructure at Altus AFB to improve the effectiveness of training; enhance quality of life; replace old inadequate facilities; and correct current deficiencies. In addition, the Air Force proposes to establish a closed traffic pattern on the west side of Altus AFB as a part of regular flight operations. There will not be any new missions, new aircraft, or personnel assigned to Altus AFB as a result of the Proposed Action.

NO-ACTION ALTERNATIVE: Under the No-action Alternative, the Air Force will not construct or alter any facilities or infrastructure at Altus AFB.

POTENTIAL DEVELOPMENT ALTERNATIVE: The Air Force proposes to accommodate the CIP requirements as in the Proposed Action but also to provide for additional installation development beyond those projects specifically identified in the Proposed Action. The Potential Development Alternative (PDA) represents a broader approach to installation and mission development at Altus AFB. Under the PDA, Altus AFB will be developed to 75 percent of its potential, which is a level substantially higher than the current development. This will equate to the development of approximately 384 acres of land on Altus AFB resulting in approximately 695,538 square feet of additional facility space and 93 acres of additional impervious cover on the installation. There will also be an increase in personnel associated with the PDA that will add approximately 426 additional personnel and dependents to the installation. Also under the PDA, aircraft operations would increase by 57 percent to approximately 242,273 annual operations. The PDA would also include the new closed loop traffic pattern called for in the Proposed Action.

SUMMARY OF FINDINGS FOR THE PROPOSED ACTION:

Airspace Use and Management. There will be no change to sortie counts. The new west closed traffic pattern would alter how a portion of air traffic operates around Altus AFB but this is not expected to generate any impacts to airspace use and management.

Noise. There will be a slight reduction in aggregate acreage predicted to be exposed to noise levels in excess of 65 dB DNL. Noise level increase from aircraft operations would be below perceptible levels. Demolition and construction activities in the vicinity of the project locations will result in short-term intermittent increases in noise levels.

Land Use. No impacts are expected. The activities in the Proposed Action will be compatible with existing land uses and will be in accordance with land use plans for the installation (the General Plan). The proposed projects will not alter existing land use designations. The Proposed Action will not impact adjacent land-use patterns.

Air Quality. There will be no mission change and no long-term impacts in air emissions. There will be a short-term increase in air emissions associated with the construction, renovation, and demolition activities. The increase in emissions will not be expected to cause the region to exceed air quality standards and will fall within the 10 percent level that would be considered regionally significant if the region were in nonattainment status for any criteria pollutants. The Proposed Action will occur in an area that is currently classified as "attainment" for National Ambient Air Quality Standards, it will not be subject to a conformity analysis, and it will not expose the public or operational personnel to hazardous levels of air emissions.

Earth Resources. The soils in the vicinity of the proposed construction projects at Altus AFB have been previously disturbed and the projects are located in improved areas with existing facilities and paved roads. There will be short-term soil disturbance as a result of the proposed construction and demolition activities.

Biological Resources. Wildlife occurring in vegetated areas disturbed by construction and demolition activities would be expected to relocate to other suitable habitat. The majority of animal and plant species found on Altus AFB are not located in the proposed construction and demolition areas. Noise from construction activities, increased traffic, and earth moving activities could temporarily disturb wildlife near construction areas.

Cultural Resources. Proposed demolition and construction within the cantonment area will have no effect on archaeological or historic properties.

Water Resources. There will be a potential for short-term increases in the sediment loading of surface water as a result of demolition and construction activities associated with the Proposed Action. There will be no overall impact to the quality of groundwater at Altus AFB or the surrounding area. There will be a potential decrease in groundwater recharge due to the increase in impervious cover.

Hazardous Materials and Wastes. There will be no mission change and no long-term impacts to hazardous materials and hazardous waste. Hazardous materials and wastes will

be managed in accordance with existing Altus AFB, state, and federal plans and regulations; and will be within the capacity of the existing system to manage. Project activities associated with the Proposed Action will have no impacts to active Environmental Restoration Program or Military Munitions Response Program sites.

Safety. There will be no mission change and no long-term impacts to safety. There will not be any new personnel associated with the Proposed Action; therefore, there will be no change in ground and traffic safety as it relates to privately owned vehicles. There will be a short-term impact to safety due to the temporary increase in construction activities.

Infrastructure and Utilities. There will be a long-term increase in potable water, electrical, and natural gas consumption and wastewater generation under the Proposed Action as part of the construction of new facilities. There will also be a short-term increase in potable water usage from dust suppression activities during construction and demolition. Short-term increases in solid waste generation and traffic on the installation will be realized due to construction and demolition activities. There will be no impacts to utility system capacities.

Socioeconomic Resources. There will be no change to the population, housing, or local school enrollment. There will be a short-term increase in local expenditures as a result of the construction and demolition projects. Given the scope of the proposed changes on Altus AFB as well as the proposed timeline for implementation, there will be no impact to the socioeconomics of the community.

Environmental Justice. There are no adverse impacts associated with the Proposed Action; therefore, there will be no disproportionate adverse impacts to minority or low-income populations.

SUMMARY OF FINDINGS FOR NO-ACTION ALTERNATIVE: The conditions and characteristics anticipated under the No-action Alternative for each resource area will continue at levels equal to those occurring under the existing, baseline conditions.

SUMMARY OF FINDINGS FOR THE POTENTIAL DEVELOPMENT ALTERNATIVE:

Airspace Use and Management. There will be no change to classification of Altus AFB as Class D Airspace and no restriction of other air traffic in the vicinity of Altus AFB. Also, there will be no need for additional or new controlled airspace, or special use airspace or expansion of existing Military Operations Areas.

Noise. There will be an extension of noise contours along all axes due to the increase in aircraft operations; however, noise level increases will be below perceptible levels. Demolition and construction activities in the vicinity of the project locations will result in short-term intermittent increases in noise levels.

Land Use. No impacts to land use compatibility are expected. The activities in the PDA will be compatible with existing land uses and will be in accordance with land use plans for the installation (the General Plan). The proposed development will alter existing land

use designations; however, the reassigned classifications will be compatible with planning goals for the installation. The PDA will not impact adjacent land-use patterns.

Air Quality. There will be a long-term increase in air emissions due to a greater number of privately owned vehicles associated with the personnel increase, as well as an increase in aircraft operations. There will be a short-term increase in air emissions associated with the construction, renovation, and demolition activities. The increase in emissions will not be expected to cause the region to exceed air quality standards and will fall within the ten percent level that would be considered regionally significant if the region were in nonattainment status for any criteria pollutants. The PDA will occur in an area that is currently classified as "attainment" for National Ambient Air Quality Standards, it will not be subject to a conformity analysis, and it will not expose the public or operational personnel to hazardous levels of air emissions.

Earth Resources. There will be short-term soil disturbance as a result of the construction, renovation, and demolition activities associated with the PDA. The soils in the vicinity of the development areas may not have been previously developed. However, no changes to topography, lithology, stratigraphy, geological structures, or the soil composition, structure, or function within the environment will be expected. Therefore, the impacts associated with the PDA will be localized to each construction site and will be controlled using best management practices to reduce soil erosion.

Biological Resources. No adverse impacts to biological resources are expected as a result of the PDA. As part of this alternative, the Air Force will develop approximately 384 acres of open area. This development will not occur in wetlands, floodplains, or areas of suitable habitat or known locations of threatened and endangered species. Wildlife present in more intensely-developed land use areas will relocate to other areas on or off of the installation. Noise created during construction and demolition activities will temporarily disturb wildlife near the project areas; however, this disturbance will be expected to be short-term and intermittent.

Cultural Resources. No impacts to archaeological resources are expected as part of the PDA.

Water Resources. There will be a potential for short-term increases in the sediment loading of surface water as a result of demolition and construction activities associated with the PDA. There will be no overall impact to the quality of groundwater at Altus AFB or the surrounding area. There will be a potential decrease in groundwater recharge due to the increase in impervious cover.

Hazardous Substances. Hazardous materials and wastes will be managed in accordance with existing Altus AFB, state, and federal plans and regulations; and will be within the capacity of the existing system to manage. Project activities associated with the PDA will have no impacts to active Environmental Restoration Program or Military Munitions Response Program sites.

Safety. There will be a short-term increase in potential for accidents due to changes in traffic and use of construction equipment, as well as a long-term increase in the potential for more traffic accidents to occur as a result of the increase in population.

Infrastructure and Utilities. There will be a long-term increase in potable water consumption, electrical and natural gas consumption, solid waste generation, wastewater generation, and traffic under the PDA as part of the construction of new facilities and the addition of personnel. There will also be a short-term increase in potable water usage from dust suppression activities during construction and demolition. Short-term increases in solid waste generation and traffic on the installation will be realized due to construction and demolition activities. There will be no impacts to utility system capacities.

Socioeconomic Resources. There will be an increase of 426 personnel and their dependents into the local community as a result of the PDA. There will also be a long-term increase in area school populations. There will be a long-term increase in housing requirements on and off base. Additionally, there will be a short- and long-term impact to the local economy as a result of the construction and demolition projects and the increase in population.

Environmental Justice. There are no adverse impacts associated with the PDA; therefore, there will be no disproportionate adverse impacts to minority or low-income populations.

SUMMARY OF CUMULATIVE EFFECTS: The cumulative impact of implementing this action along with other past, present, and reasonably foreseeable future action in the Region of Influence were assessed in the attached EA. Cumulative impacts identified include an increase in soil disturbance associated with construction activities; an increase in impervious cover, and therefore, and increase in surface water runoff; an increase in short-term safety risks associated with construction activities; and an increase in utilities consumption and solid waste generation.

SUMMARY OF PUBLIC REVIEW AND INTERAGENCY COORDINATION: The Environmental Assessment and draft Finding of No Significant Impact was available to the public for 30 days at the Altus Public Library and the Altus AFB Library. Copies were also sent to a list of interested persons. There were six unique comments received during the public comment period. Two of the comments noted concurrence or noted no objections. One comment concurred that, under the Proposed Action, no Section 404 permit is required; however, in the event that future proposals necessitate a discharge into jurisdictional waters, a permit will be required. Three comments were related to the proposed west traffic pattern for aircraft operations. One of the three comments raised concerns over aircraft safety and a recommendation for coordination with additional city planners. The second comment raised concerns over safety, increases in noise, and questions regarding aircraft flying training operations. The third aircraft operations comment concerned safety and increased noise, as well as socioeconomic issues at the Altus Quartz Mountain Regional Airport. All comments were addressed within the EA text and a response to the three aircraft operations comments is provided in Appendix A.

FINDING OF NO SIGNIFICANT IMPACT: Based upon my review of the EA attached and incorporated by reference, I conclude that neither of the alternatives, nor the Proposed Action, will have a significant direct, indirect, or cumulative impact upon the environment. Accordingly, the requirements of the NEPA, regulations promulgated by the President's Council on Environmental Quality, and 32 CFR Part 989 are fulfilled and an Environmental Impact Statement is not required at this time.

	25-Feb-10
STUART J. SHAW, Colonel, USAF	Date

Vice Commander
97th Air Mobility Wing

FINDING OF NO PRACTICABLE ALTERNATIVE: Pursuant to Executive Order 11988, and considering all supporting information, I find that there is no practicable alternative to repaving runway 17L/35R, located in a 100-year floodplain, as described in the Proposed Action and PDA in the attached EA. The attached EA identifies all practicable measures to minimize harm to the existing environment.

The proposed construction activities associated with runway 17L/35R would technically occur in a floodplain, as the existing runway crosses an area that has been delineated as a floodplain. However, the action would only involve replacing the existing asphaltic cement surface of the runway with granitic concrete. During this activity, the existing elevations and floodplain environment would be preserved allowing for no impact to the existing floodplain.

MARK A. CORRELL, Colonel, USAF	Date

The Civil Engineer
Headquarters Air Education and Training Command

FINDING OF NO SIGNIFICANT IMPACT: Based upon my review of the EA attached and incorporated by reference, I conclude that neither of the alternatives, nor the Proposed Action, will have a significant direct, indirect, or cumulative impact upon the environment. Accordingly, the requirements of the NEPA, regulations promulgated by the President's Council on Environmental Quality, and 32 CFR Part 989 are fulfilled and an Environmental Impact Statement is not required at this time.

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25-Feb-10

STUART J. SHAW, Colonel, USAF — Date

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FOR MARK CORRELL

4 MAR 11

MARK A. CORRELL, Colonel, USAF — Date
The Civil Engineer
Headquarters Air Education and Training Command

NOTE: FONPA signed by the AETC Civil Engineer, Colonel David Demartino, for the former AETC CE, Colonel Mark Correll.

General Plan-Based Environmental Impact Analysis Process Environmental Assessment

Altus Air Force Base

United States Air Force
Air Education and Training Command
97th Air Mobility Wing
Altus Air Force Base, Oklahoma

November 2009

Cover Sheet

COVER SHEET

Responsible Agency: 97th Civil Engineer Squadron (97 CES), Altus Air Force Base (AFB), Oklahoma

Proposed Action: Installation Development at Altus AFB, Jackson County, Oklahoma

Points of Contact: Altus AFB Environmental: Mr. James Bellon, 97CES/CEAO, 119 607 S. 1st Street, Building 396, Altus AFB, Oklahoma 73523-5138, (580) 481-7606

Report Designation: Environmental Assessment (EA)

Abstract: The 97 CES at Altus AFB is planning future installation development based upon the Capital Improvements Program (CIP) contained within the current *Altus AFB General Plan* (General Plan). The purpose of the proposed and alternative actions is to construct, renovate, demolish, and operate facilities and infrastructure to support current and potential future training levels at Altus AFB and to improve the effectiveness of training; enhance quality of life; replace old, inadequate facilities; and correct current deficiencies. The proposed and alternative actions provide a range of construction, renovation, and demolition scenarios so that a comparison can be made of the impacts from the status quo, implementation of the CIP and related mission projects, and construction and demolition of the installation to a substantially higher level of mission activity.

There would be no new missions, personnel or aircraft assigned to Altus AFB as a result of the Proposed Action. The Air Force proposes to implement the CIP projects identified in the General Plan and other mission activities in support of the ongoing mission at Altus AFB, including establishing a closed traffic pattern on the west side of Altus AFB as a part of regular flight operations. The Potential Development Alternative (PDA) represents a broader approach to installation and mission development at Altus AFB. The PDA would incorporate the west closed traffic pattern, construction and demolition activities defined in the Proposed Action, as well as broader installation expansion. Under the PDA, approximately 384 acres of land would be developed at Altus AFB. This would represent development of approximately 75 percent of the developable land on Altus AFB. The PDA would also result in an additional 426 personnel and dependents at Altus AFB. Under the No-action Alternative, there would be no construction, renovation, or demolition activities at Altus AFB.

The following resources were identified for study in this EA: Airspace Use and Management, Noise, Land Use, Air Quality, Earth Resources, Biological Resources, Cultural Resources, Water Resources, Hazardous Materials and Wastes, Safety, Infrastructure and Utilities, Socioeconomic Resources, and Environmental Justice.

PRIVACY ADVISORY NOTICE

Letters or other written comments provided may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

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APPENDICES

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Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS

%	percent
°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
ACM	asbestos-containing material
AFB	Air Force Base
AFI	Air Force Instruction
AGE	aerospace ground equipment
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AMW	Air Mobility Wing
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
ARW	Air Refueling Wing
ATC	Air Traffic Control
ATFP	Anti-Terrorism/Force Protection
BMP	Best Management Practice
C&D	construction and demolition
CAA	Clean Air Act
CENRAP	Central Regional Air Planning Association
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES/CEV	Civil Engineer Squadron/Environmental Management
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIP	Capital Improvements Program
CO	carbon monoxide
COC	Community of Comparison
CWA	Clean Water Act
DASR	Digital Airport Surveillance Radar
dB	decibel
dBA	“A-weighted” decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DV	Distinguished Visitors
DZ	drop zone
EA	Environmental Assessment
EDMS	Emissions and Dispersion Modeling System
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ERP	Environmental Restoration Program

ACCRONYMS AND ABBREVIATIONS (CONTINUED)

ESA	Endangered Species Act
FAA	Federal Aviation Administration
FICON	Federal Interagency Committee on Noise
FIX	Facility Infrastructure Examination
FY	fiscal year
gpd	gallons per day
HAWC	Health and Wellness Center
HRMA	Housing Requirements and Market Analysis
HVAC	Heating, Ventilation, and Air Conditioning
IAP	initial accumulation point
IFR	instrument flight rules
IICEP	Intergovernmental and Interagency Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IR	Instrument Routes
JLUS	Joint Land Use Study
kcf	thousand cubic feet
LBP	lead-based paint
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
LOP	Letter of Procedure
LTM	Long-term monitoring
MACA	Mid-Air Collision Avoidance
MFH	Military Family Housing
mgd	million gallons per day
MMRP	Military Munitions Response Program
MOA	Military Operations Area
mph	miles per hour
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheets
MSL	mean sea level
MTR	Military Training Route
MWh	megawatt-hours
NAA	nonattainment area
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NCO	Non-commissioned Officers
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLR	noise level reduction

ACCRONYMS AND ABBREVIATIONS (CONTINUED)

NM	nautical mile
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
ODEQ	Oklahoma Department of Environmental Quality
ODWC	Oklahoma Department of Wildlife Conservation
OSHA	Occupational Safety and Health Administration
OSI	Office of Special Investigations
PDA	Potential Development Alternative
PM_{10}	particulate matter less than ten micrometers in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in aerodynamic diameter
PMEL	Precision Measuring Equipment Lab
POV	privately owned vehicle
ppm	parts per million
PVC	polyvinyl chloride
RA-C	Remedial Action - Construction
RAPCON	Radar Approach Control
R-Areas	Restricted Areas
RCRA	Resource Conservation and Recovery Act
ROD/DD	Record of Decision/Decision Document
ROI	Region of Influence
SAC	Strategic Air Command
SDZ	Surface Danger Zone
SEL	Sound Exposure Level
SF	square feet
SIP	state implementation plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SPL	Sound Pressure Level
SR	slow routes
SUA	Special Use Airspace
SWPPP	Storm Water Pollution Prevention Plan
TCE	tetrachloroethylene
tpy	tons per year
TRSA	Terminal Radar Service Areas
TSCA	Toxic Substances Control Act

ACCRONYMS AND ABBREVIATIONS (CONTINUED)

USACE	United States Army Corps of Engineers
USC	Untied States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VFR	visual flight rules
VOC	volatile organic compound
VR	Visual Routes
WRAP	Western Regional Air Partnership
WWTP	Wastewater Treatment Plant

Chapter 1

Purpose of and Need for Action

CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

This chapter has six parts: a statement of the purpose of and need for action, a description of the location of the proposed and alternative actions, identification of the decision to be made, a description of the scope of the environmental review, identification of applicable regulatory requirements, and an introduction to the organization of the document.

1.1 PURPOSE OF AND NEED FOR ACTION

The 97th Civil Engineer Squadron (97 CES) at Altus Air Force Base (AFB), Oklahoma is planning future installation development based upon the Capital Improvements Program (CIP) contained within the current Altus AFB General Plan (General Plan). Currently, Altus AFB operates the Air Education and Training Command's strategic airlift and aerial refueling flying training schools and maintains and supports C-17 and KC-135 aircraft. The General Plan includes a profile of the installation and vicinity, summary of constraints and opportunities impacting future development potential, current and proposed infrastructure and land use, and CIPs. This Environmental Assessment (EA) will analyze impacts of projects based on the CIPs and related mission activities.

The purpose of the proposed and alternative actions is to construct, renovate, and demolish facilities and infrastructure at Altus AFB as part of the Installation Development activities outlined in the General Plan, as well as establish a closed traffic pattern on the west side of Altus AFB as a part of regular flight operations. The projects resulting from the CIP are needed to provide for critical infrastructure projects required to achieve the goals for installation development in accordance with the Installation General Plan. These goals include:

- Provide maximum operational support and to be prepared to perform missions as assigned;
- Ensure the protection, supply, use, and management of human, financial, environmental, and constructed resources;
- Promote public health, safety, welfare, and overall quality of life;
- Promote compatible land use development near airfields in a manner that will limit restrictions to base operations while protecting adjacent communities;
- Provide an effective, orderly, and obtainable direction for future development;
- Promote an efficient traffic flow pattern between functionally related land uses;
- Enhance the Base visual and aesthetic resources;
- Collocate or consolidate activities that are functionally related in an effort to improve operational efficiency; and
- Freedom to use Altus class D airspace to the field's west as another visual flight rules (VFR) pattern. Despite recent reductions of total wing flight time, the addition of a west pattern would help to address syllabus changes as well as alleviate congestion already existing in east VFR pattern.

The proposed and alternative actions will provide a range of construction, renovation, and demolition scenarios so that a comparison may be made of the impacts from the status quo, implementation of the CIP and related mission projects, and construction, renovation, and demolition of the installation to its sustainable capacity.

1.2 LOCATION OF THE PROPOSED ACTION

Altus AFB is located in Jackson County, within the city limits of Altus, Oklahoma (Figure 1-1). The City of Altus is located approximately 60 miles west of Lawton, 140 miles southwest of Oklahoma City and about 15 miles north of the Oklahoma/Texas border. Altus AFB consists of 4,069 acres of land of which approximately 3,396 acres are considered developed.

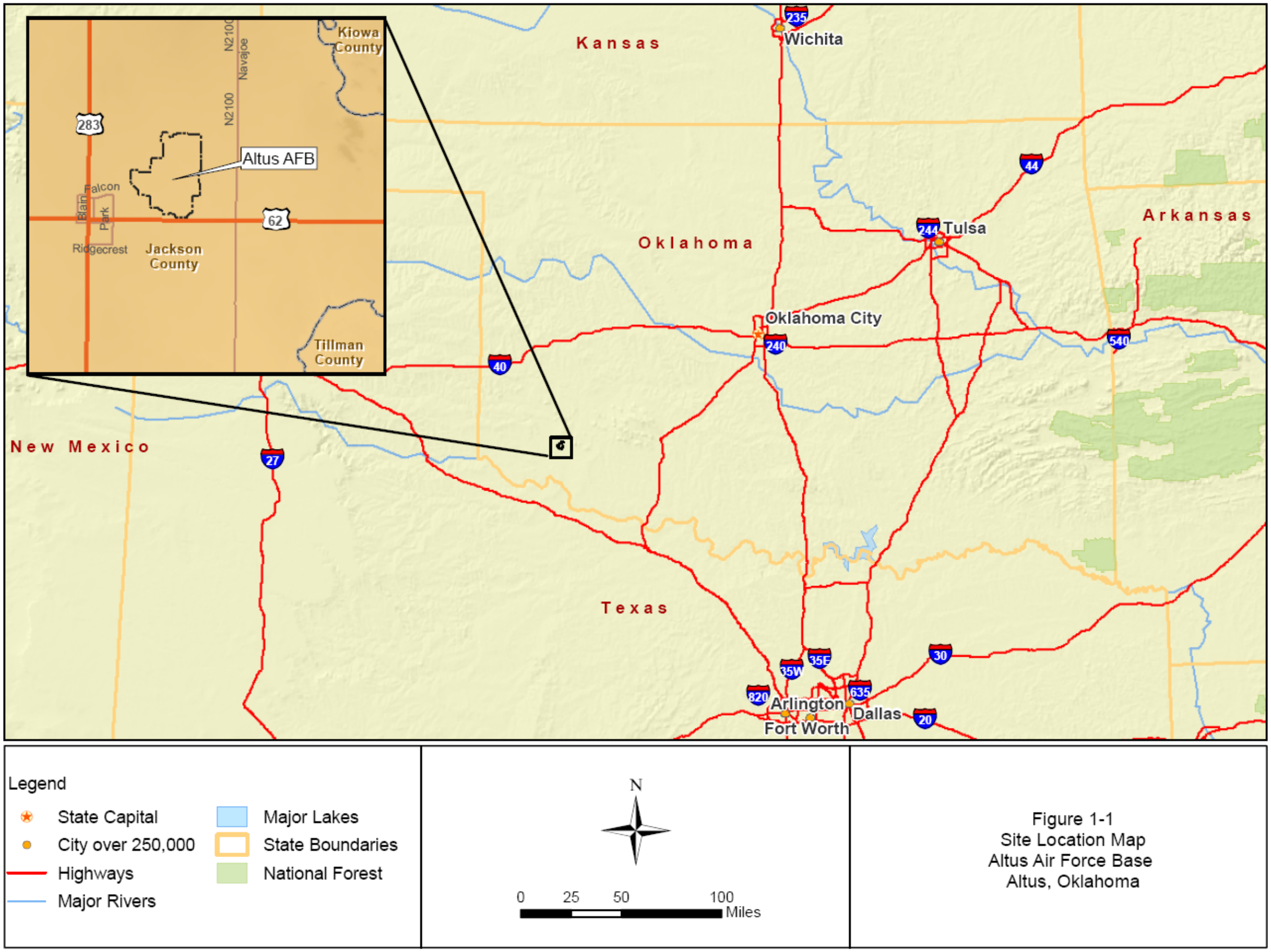

Figure 1-1
Site Location Map
Altus Air Force Base
Altus, Oklahoma

1.3 DECISION TO BE MADE

This analysis evaluates the potential environmental consequences of actions associated with construction, renovation, and demolition of facilities and infrastructure at Altus AFB. The construction and demolition projects associated with the Proposed Action would complete the implementation of Altus AFB's CIP. Based on this information, the Air Force will determine whether to implement the Proposed Action, take no action ("No-action Alternative"), or implement the Potential Development Alternative (PDA). As required by the National Environmental Policy Act (NEPA) and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project, and must be available to inform decision-makers of the potential environmental impacts of selecting the Proposed Action, No-action Alternative, or the PDA.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

NEPA requires Federal agencies to consider environmental consequences in their decision-making process. The President's Council on Environmental Quality (CEQ) has issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental impact analysis. The Air Force *Environmental Impact Analysis Process* (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508), Department of Defense (DoD) Instruction 4715.9 *Environmental Planning and Analysis,* and 32 CFR 989 (Environmental Impact Analysis Process), 15 July 1999, and amended 1 July 2005. These Federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action.

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with construction, renovation, and demolition of facilities and infrastructure at Altus AFB, taking into consideration possible cumulative impacts from other actions. The potential environmental effects of taking no action are also described. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Fiscal year (FY) 2008 or the most current information is used as the baseline condition.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the President on 11 February 1994. In the EO, the President instructed each Federal agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Adverse is defined by the Federal Interagency Working Group on Environmental Justice as "having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms." This EA will determine if the proposed or alternative actions would result in adverse effects to low-income or minority populations.

No independent actions concurrent with the proposed or alternative actions have been identified by Altus AFB or the surrounding community. Through Intergovernmental and Interagency Coordination for Environmental Planning (IICEP), requests have been made for information on planned actions in the surrounding community. If any concurrent actions are identified during the EA process, they will be examined only in the context of potential cumulative impacts. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

1.4.1 Resource Areas Addressed in Detail

Resource areas that could be affected by the proposed or alternative actions have been selected to allow for a comprehensive analysis of potential impacts. The following resource areas are discussed in detail in the EA:

- Airspace Use and Management
- Noise
- Land Use
- Air Quality
- Earth Resources
- Biological Resources
- Cultural Resources
- Water Resources
- Hazardous Materials and Wastes
- Safety
- Utilities and Infrastructure
- Socioeconomic Resources
- Environmental Justice

1.4.2 Resource Topics Eliminated from Detailed Analysis

All resources would be affected by the proposed or alternative actions; therefore, no resources have been eliminated from further study in this document.

1.5 APPLICABLE REGULATORY REQUIREMENTS

This EA is part of the EIAP for the proposed project and was prepared in compliance with NEPA regulations. The following paragraphs describe the laws and regulations that apply or may apply to the proposed and alternative actions.

1.5.1 Interagency and Intergovernmental Coordination

Federal, state, and local agencies with jurisdiction that could be affected by the proposed or alternative actions have been notified and consulted. A complete listing of the agencies consulted may be found in Chapter 6 and IICEP correspondence and responses are included in Appendix A. This coordination fulfills the Interagency Coordination Act and EO 12372 *Intergovernmental Review of Federal Programs* (14 July 1982), which requires Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. EO 12372 is implemented by the Air Force in accordance with Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*.

1.5.2 Permits

The contractor would be required to obtain an Air Force Form 103 *Base Civil Engineer Work Clearance Request* permit (work permit) prior to any construction activities. All underground utility locations would need to be identified prior to any construction activities. The contractor would also ensure that a storm water pollution prevention plan (SWPPP) was completed and approved before initiating construction activities.

1.5.3 Other Regulatory Requirements

The EA considers all applicable laws and regulations, including but not limited to the following:

- *Clean Air Act* (42 United States Code [USC] 7401 et seq.)
- *Clean Air Act Amendments of 1990* (CAA) (42 USC 7401 et seq.)
- EO 11990, *Protection of Wetlands* (24 May 1977)
- *Clean Water Act* (CWA) (33 USC 1251 et seq.)
- Section 404 of the CWA (33 USC 1251 et seq., 40 CFR 232.2)
- Section 10 of the *Rivers and Harbors Act of 1899* (33 USC 403)
- EO 11988, *Floodplain Management* (24 May 1977)
- *Coastal Zone Management Act* (16 USC 1451-1456)
- *Endangered Species Act* (ESA) (16 USC 1531-1542)
- *Pollution Prevention Act* (42 USC 13101 and 13102 et seq.)
- *Archaeological Resources Protection Act* (ARPA) (16 USC 470 et seq.)
- *National Historic Preservation Act* (NHPA) (16 USC 470)
- *American Indian Religious Freedom Act* (AIRFA) (42 USC 1996)
- *Protection of Historic Properties* (36 CFR 800)
- *Native American Graves Protection and Repatriation Act of 1991* (25 USC 3001 et seq.)
- *Resource Conservation and Recovery Act* (RCRA) (40 CFR Parts 240-244, 257, 258, 260 et seq.)
- *Toxic Substance Control Act* (TSCA) (15 USC 2601 et seq.)
- *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (42 USC 9610)

- *Superfund Amendments and Reauthorization Act* Title III (40 CFR 300 et seq.)
- *Emergency Planning and Community Right-to-Know Act* (16 USC 116)
- EO 12580, *Superfund Implementation* (23 January 1987)
- *Occupation Safety and Health Act* (29 USC 651 et seq.)
- *Energy Independence and Security Act* (Public Law 110-140)
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (11 February 1994)

1.6 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

This EA is organized into seven chapters.

Chapter 1 Contains a statement of the purpose of and need for action, the location of the proposed and alternative actions, identification of the decision to be made, a summary of the scope of the environmental review, identification of applicable regulatory requirements, and a description of the organization of the document.

Chapter 2 Describes the history of the formulation of alternatives, identifies alternatives eliminated from further consideration, provides a detailed description of the Proposed Action, describes the No-action and other action alternatives, summarizes other actions announced for Altus AFB and the surrounding community, provides a comparison matrix of environmental effects for all alternatives, identifies the preferred alternative, and describes measures to minimize or reduce impacts.

Chapter 3 Contains a general description of the current conditions of the resources that could potentially be affected by the proposed or alternative actions.

Chapter 4 Provides an analysis of the environmental consequences of the proposed and alternative actions.

Chapter 5 Lists preparers of this document.

Chapter 6 Lists persons and agencies consulted in the preparation of this EA.

Chapter 7 Lists source documents relevant to the preparation of this EA.

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Chapter 2

Description of the Proposed Action and Alternatives

CHAPTER 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter has nine parts: a brief history of the formulation of alternatives, identification of alternatives eliminated from further consideration, a description of the Proposed Action, a description of the PDA, a description of the No-action Alternative, identification of other proposed actions planned for Altus AFB and the surrounding community, a summary of environmental impacts of all alternatives, identification of the preferred alternative, and a table of measures to minimize impacts.

2.1 HISTORY OF THE FORMULATION OF ALTERNATIVES

The alternatives developed for the analysis at Altus AFB are designed to capture the range of possible development and activity levels from the No-action Alternative to the PDA. The General Plan developed for Altus AFB identifies specific CIP projects, while the Capability Analysis for Altus AFB identifies the expansion potential of the current mission activity. The projects and potential development defined in both of these documents would occur between the years 2010 and 2015. Based on these documents, three viable installation development alternatives were identified:

- No-action Alternative – Continue technical training and use of existing facilities at Altus AFB.
- Proposed Action – Implement construction of facilities to accomplish the CIP, including demolition of facilities that are either dilapidated or in the footprint of proposed CIP construction. Establish a new air traffic pattern on the west side of Altus AFB.
- PDA – Implement all of the projects contained within the Proposed Action, as well as the development of available land at Altus AFB to accommodate future growth of the installation.

Under both the Proposed Action and PDA, one discreet project, associated with Runway 17L/35R, would occur in a floodplain. The project involves repair of an existing runway that crosses an area that has been delineated as floodplain. As impacts to the floodplain from repair activities would not be expected, and relocation of the existing runway is not feasible and could potentially result in greater impacts to existing resources, a Finding of No Practicable Alternative for this specific project was prepared.

2.2 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

A range of development scenarios were considered as alternatives. These alternatives allowed for developing various percentages of developable land (as identified in the *2008 Altus AFB Natural Infrastructure Assessment*) over and above existing development, in addition to implementing the CIP. A 20 percent development scenario would not leave sufficient headspace for CIP implementation, and a 100 percent development scenario would be unrealistic for a 5-year period.

Additional alternatives associated with an incremental approach to implementing the CIP were not considered. Such alternatives were eliminated because the projects included in the CIP

provide for critical infrastructure required to achieve goals for installation development in accordance with the Installation General Plan. Since all of the projects identified in the General Plan are required to effectively accomplish the installation's mission, implementing only part of the CIP would not meet the agency's purpose and need. Analyzing the impact of the entire CIP also provides a comprehensive look at planned installation development within the planning timeframe contained in the General Plan. This approach prevents "piecemeal" analysis of the impacts associated with installation development and provides for better assessment of cumulative impacts.

Additionally, the option of leasing space off-base for training and support requirements was eliminated because there are no facilities in the local community capable of supporting any of these requirements.

2.3 DETAILED DESCRIPTION OF THE PROPOSED ACTION

2.3.1 Flying Operations

No additional aircraft are proposed to be stationed at Altus AFB as part of the Proposed Action. Table 2-1 presents the aircraft inventory that currently exists and that would result from implementation of the Proposed Action.

Flying operations, which typically fluctuate somewhat from year to year, are not proposed to increase appreciably under the Proposed Action. Currently, approximately 154,300 annual aircraft operations occur at Altus AFB. The aircraft stationed at Altus AFB include: the C-17 *Globemaster*, a four-engine heavy cargo aircraft, and the KC-135 *Stratotanker*, a four-engine aerial refueling aircraft. Training at Altus AFB includes pilot and aircrew training for the C-17 *Globemaster* and the KC-135 *Stratotanker*. Additionally, Altus AFB supports operational airlift and aerial refueling missions. A wide variety of transient aircraft also use Altus AFB over the course of a given year, including heavy cargo jet aircraft, bombers, and fighters from other Air Force bases.

One portion of the Proposed Action is to incorporate a VFR closed traffic pattern on the west side of Altus AFB as part of regular flight operations. A VFR closed pattern to the inside runway (17R/35L) is proposed. For operations taking off or landing to the north (35L), left turns would occur. For operations occurring to the south (17R), right turns would occur. The west VFR patterns are needed to improve the effectiveness of training, flight operations, and airfield throughput. Although level of activity between the baseline and Proposed Action would remain the same, approximately 40 percent of inside closed VFR traffic would be conducted to the new west pattern. Quantifying the exact amount of inside closed pattern VFR traffic is difficult. As an airlift "schoolhouse", there are several training programs for both the KC-135 and C-17 at Altus AFB. The number and mix of closed pattern operations within each of these programs of instruction varies as the training purposes of each of these syllabi vary. Generally speaking, on an average busy day for Altus AFB, approximately three to nine percent of installation air traffic, depending upon the airframe type, would use this new pattern. This is a rough estimate for illustration purposes only. It is important to note that while typical flight patterns are identifiable and average numbers of operations can be calculated over the course of a year, the particular flight path that is observed on a given day varies for a variety of reasons, including winds,

weather conditions, pattern saturation, and the particular course of instruction for which a given sortie is flown. Currently, all closed VFR traffic patterns are conducted to the east and utilize only the outside of the two parallel runways at Altus AFB. The west closed traffic pattern would be conducted to the inside parallel runway while the east closed traffic pattern would be conducted to the outside parallel runway. Figure 2-1 depicts the west closed traffic pattern flight ground tracks for Runway 17R/35L.

Table 2-1 Aircraft Counts

Aircraft Type	FY2007 Baseline	Additional Aircraft/Percent Increase (%)	Proposed Action End State
C-17	15	0	15
KC-135	24	0	24
TOTAL	**39**	**0**	**39**

In discussing flying operations at an airfield, it is helpful to define the following terms:

- <u>Sortie:</u> A sortie is defined as a single military aircraft flight from initial takeoff through termination landing.
- <u>Aircraft Operation:</u> An aircraft operation is defined as one takeoff/departure, one approach/landing, or half of a closed pattern.
- <u>Closed Pattern:</u> A closed pattern consists of two operations, a takeoff/departure and an approach/landing.

As a result, one sortie will ordinarily consist of at least two aircraft operations, a takeoff/departure and an approach/landing. It will often have more than two operations, however, depending upon the number of closed patterns flown. Each phase of flight utilizes a particular flight path.

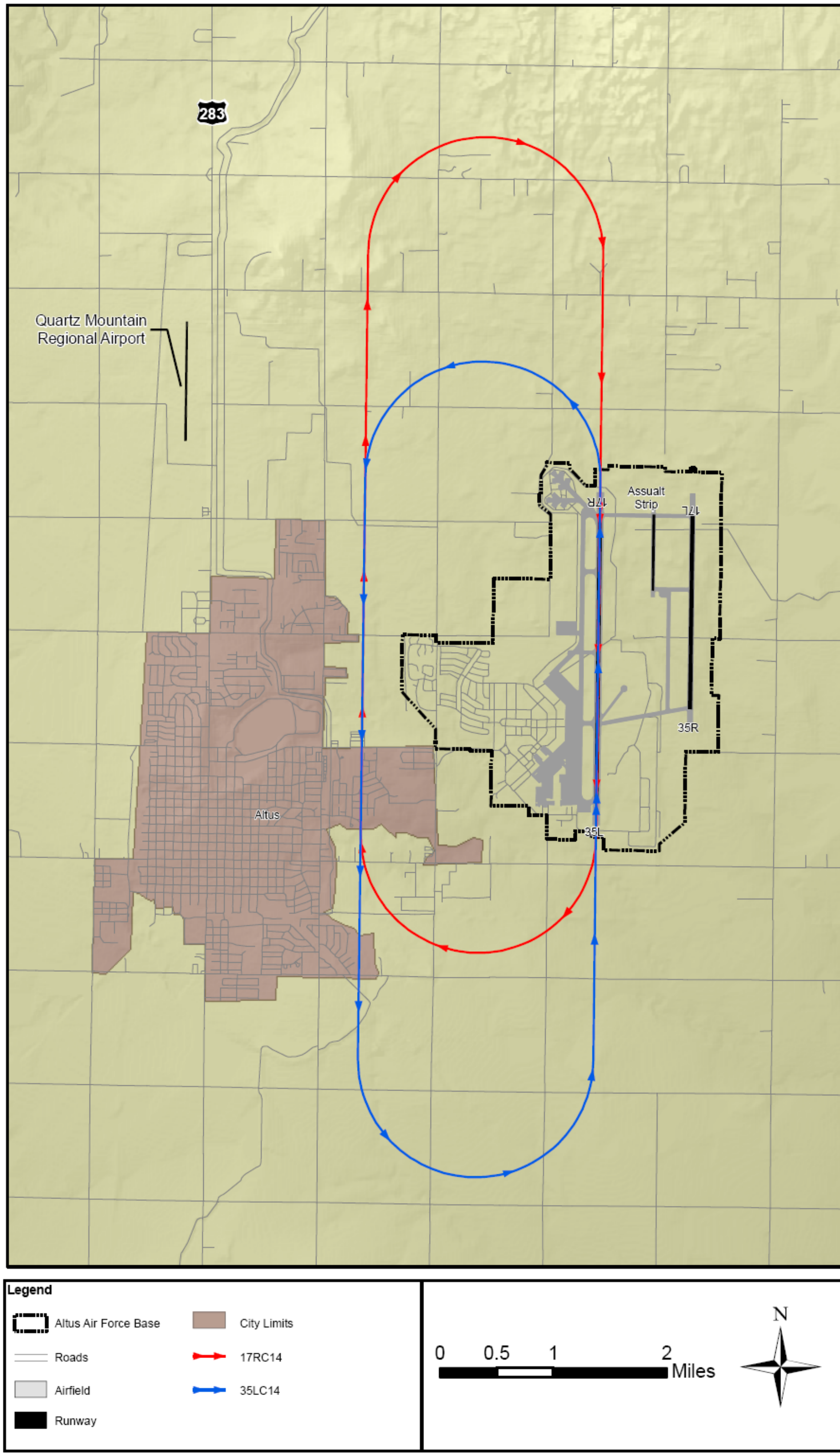


Figure 2-1

Proposed West VFR Pattern

Altus Air Force Base
Altus, OK

2.3.2 Construction and Demolition

The Proposed Action would construct and demolish facilities and infrastructure at Altus AFB to improve effectiveness of training, enhance quality of life, replace old, inadequate facilities, and correct current deficiencies. There would be no new missions and no additional personnel assigned to Altus AFB as a result of the Proposed Action. Figure 2-2 shows the buildings to be constructed, renovated, and demolished at Altus AFB as part of the Proposed Action. The Air Force proposes to implement the CIP projects identified in the General Plan and other mission activities in support of the ongoing mission at Altus AFB. Table 2-2 contains information on the proposed projects.

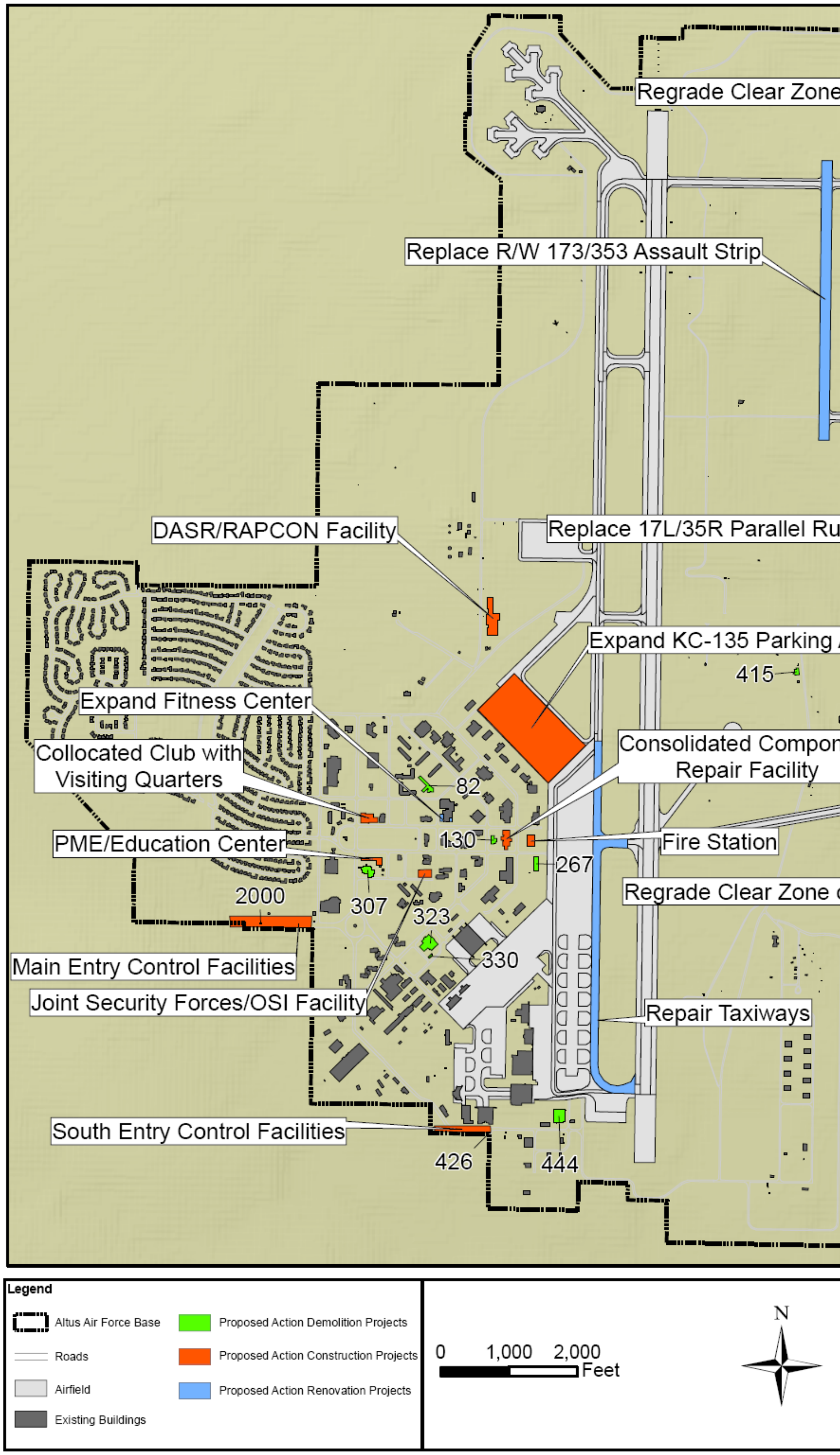


Figure 2-2
Proposed Action Demolition, Construction, and Renovation Projects

Altus Air Force Base
Altus, OK

Table 2-2 Proposed Action Construction and Demolition

Programmed Year	Bldg #	Project Title	Description	Renovation (SF)	New Construction (SF)	Additional Infrastructure (SF)	Demolition (SF)	Removal of Pavement and Roadways (SF)	Impervious Cover Increase (SF)
2011	near 525	Construct DASR/RAPCON Facility	The new building would be sited near the existing Control Tower, Building 525 and would house DASR, RAPCON and Air Traffic Control training functions. Facility construction is composed of a concrete foundation, structural steel framing, masonry/concrete veneer, standing seam metal roof and a parking area. Demolition would include the removal of Building 415 totaling 6,039 square feet. In addition, two existing golf course holes must be relocated in accordance with the Altus AFB 2030 Plan. The facility includes minimum DoD Force Protection standards.	--	31,506	13,455	6,039	--	38,922
2010	--	Repair Taxiways	Remove and dispose of existing asphalt and stressed pavements on the taxiway and apron areas and shoulders. Place new asphalt and concrete pavements in the taxiway and apron areas. Replace taxiway edge lighting and conduit.	--	--	877,374	--	500,000	377,374
2011	new	Construct Consolidated Component Repair Facility	Construct 43,000 square foot (SF) Consolidated Component Repair Facility (Precision Measuring Equipment Lab [PMEL]): Construct 43,000 SF facility to house all shops that fall under the purview of the Component Repair Division of the Maintenance Directorate. Facility would consolidate shops currently housed in four sub-standard facilities. Shops include PMEL, Avionics, Battery, Oxygen, Survival Equipment, & Hydraulics shops. Isolate HVAC to PMEL & Survival Equipment shop from HVAC of other shops. Demolition would include the removal of buildings, 323, 330 and 15,000 SF of building 444 for a total of 52,170 SF. PMEL must meet requirements of Air Force Manual 32-1094, Chapter 10, which includes the ability to tightly control humidity and temperature and maintain positive air pressure in the lab via airlocks.	--	43,000	--	52,170	--	(9,170)
2011	new	Construct Fire Station	Reinforced concrete foundation and floors, masonry walls and roof system. Includes a minimum of six drive-through vehicle bays, alarm communication center, training facilities, living quarters with sleeping quarters for a minimum of eighteen personnel, recreation/dining, administration, maintenance, repair, storage, and support areas. Demolition would include the removal of building 267.	--	30,193	--	16,332	--	13,861
2014	156	Expand Fitness Center	Expand Fitness Center: Construct second floor to building 156 for exercise room, cardiovascular equipment room and the HAWC. Renovate area for free and resistance weight training rooms. Upgrade mechanical and electrical systems for the facility.	17,470	--	--	--	--	0
2012		Regrade Clear Zones of 17L/35R	Correct Grade Changes in Clear Zone: Correct transverse grade problems and violations within the lateral clearance zone and runway clear zones at Runway 17L/35R north and south.	34,848,000	--	--	--	--	0
2012	426 & 2000	Construct Main & South Entry Control Facilities	Reconfigure Main & South Gates to meet ATFP standards. Reroute roads, construct covered inspection areas, install pop up barriers, relocate guard shacks, & provide overwatch areas. Demolish 1,076 square feet of Guard Houses and 53,819 square feet of existing roadways and improvements.	--	7,535	304,621	1,076	53,820	257,260
2015	new	Construct Collocated Club with Visiting Quarters	Construct a collocated club with visiting quarters. Club would include lodging front desk to replace building 82, officer's club, NCO club, conference room, DV suites and about 40 additional rooms. Demolition would include removal of building 307 and 6,000 SF of building 82.	--	35,000	--	30,000	--	5,000
2012	--	Expand KC-135 Parking Apron	Excavate, prepare sub-base and base and install 21-inch portland cement concrete apron and taxiway. Install asphalt, apron lights, pavement markings, and drainage.	--	32,000	--	--	--	32,000
2014	--	Replace Runway 17A/35A Assault Strip	Replace surface of assault strip runway. The entire 4,350 foot runway would be changed from existing asphaltic cement concrete surface to a 75-foot wide, 18-inch thick granitic aggregate concrete keel, and asphalt shoulders.	326,250	--	--	--	--	0

Table 2-2 Proposed Action Construction and Demolition (Continued)

Programmed Year	Bldg #	Project Title	Description	Renovation (SF)	New Construction (SF)	Additional Infrastructure (SF)	Demolition (SF)	Removal of Pavement and Roadways (SF)	Impervious Cover Increase (SF)
2015	new	Construct Joint Security Forces/OSI Facility	Construct a new joint use facility to house the 97th Security Forces Squadron operations and supply/mobility functions, the OSI Detachment 422, and the Wing ATFP Office. Demolition would include the removal of building 130.	--	22,500	--	14,000	--	8,500
2015	Runway 17L/35R	Replace Runway 17L/35R, Parallel Runway	Replace asphaltic cement concrete surface of parallel Runway 17L/35R with granitic concrete keel and all shoulders.	1,350,000	--	--	--	--	0
2015	new	Professional Military Education/Education Center	Consolidate First Term Airman's Center, Airman Leadership School, Honor Guard and Education Center into one facility.	--	34,000	--	--	--	34,000
			Total	**36,541,720**	**235,734**	**1,195,450**	**119,617**	**553,820**	**757,747**

Notes:
AFB – Air Force Base
ATFP – Anti-Terrorism/Force Protection
DASR - Digital Airport Surveillance Radar
DoD – Department of Defense
DV – Distinguished Visitors
HVAC – Heating, Ventilation, and Air Conditioning
NCO – Non-commissioned Officers
OSI – Office of Special Investigations
PMEL – Precision Measuring Equipment Lab
RAPCON – Radar Approach Control

2.3.3 Personnel Changes

There are currently 1,403 military and 2,431 civilian personnel assigned to Altus AFB. Including dependents, Altus AFB supports approximately 5,347 total personnel (USAF 2007a, Siens 2008, and Bellon 2008). There would be no additional personnel assigned to Altus AFB as a result of the Proposed Action.

2.4 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the No-action Alternative, the Air Force would not construct, renovate, or demolish any facilities or infrastructure at Altus AFB. Additionally, aircraft operations would not change from current conditions.

2.5 DESCRIPTION OF OTHER ACTION ALTERNATIVES

2.5.1 Potential Development Alternative

A Capability Analysis was completed for the installation that defined the total development potential, or development headroom, for Altus AFB. Because it is an unrealistic expectation for the Air Force to consume 100 percent of the development headroom within the next five to eight years, a more realistic growth scenario of 75 percent of the potential development headroom was established for the installation.

The PDA represents a broader approach to installation and mission development at Altus AFB. The PDA includes all of the projects contained within the Proposed Action, as well as projects that would develop 75 percent of developable land on Altus AFB. This level of development would be substantially higher than the current development level.

2.5.1.1 Flying Operations

No additional aircraft are proposed to be stationed at Altus AFB as part of the PDA. Under the PDA, aircraft operations would increase by 57 percent to approximately 242,281 annual operations. This increase, while not exceeding the design throughput of the airfield of 284,400 annual operations under Instrument Flying Rules or 388,800 annual operations under Visual Flying Rules, may be achieved by increasing the number of hourly operations, increasing the flying window during which operations occur (i.e., flying more hours in a given day), or some combination of both. No specific plans for a beddown of additional aircraft or flying units is proposed, rather, this alternative assumes growth in the mission of the existing aircraft. The resulting level of activity is presented in Table 2-3. Additionally, as under the Proposed Action, implementation of the PDA would incorporate the west closed traffic pattern. The percentage of operations to the west traffic pattern under the PDA would remain the same as the baseline and Proposed Action; however, the number of operations would correspondingly increase by 57 percent under this alternative.

Table 2-3 Aircraft Operations

Aircraft Type	FY2008 Baseline and Proposed Action			Potential Development Alternative			Increase in Average Daily Operations (%)
	Annual Sorties	Average Annual Operations[a]	Average Daily Operations[b]	Annual Sorties	Average Annual Operations[a]	Average Daily Operations[b]	
C-17	2,462	48,236	200.98	3,868	75,735	315.55	57
KC-135	3,600	106,080	442.00	5,652	166,546	693.94	57
TOTAL[c]	**6,062**	**154,316**	**642.98**	**9,520**	**242,281**	**1009.49**	**57**

Notes:
[a] Based upon historical flying operations at Altus AFB, the following Baseline and Proposed Action aircraft operations per sortie factors were used for based aircraft: C-17 (19.5922 operations/sortie); KC-135 (29.46667 operations/sortie). The operations per sortie factors for the Potential Development Alternative Action aircraft are essentially identical.
[b] Average Daily Operations equals the Average Annual Operations divided by the flying days per year which are: 240 days per year (C-17 and KC-135).
[c] Transient aircraft sorties are not presented in this table as they represent less than two percent of total aircraft operations at Altus AFB. Numbers may not add up due to rounding.

2.5.1.2 Construction and Demolition

Under the PDA, a total of approximately 384 acres of land would be developed on Altus AFB, resulting in approximately 695,538 square feet (SF) of additional facility space and 93 acres of additional impervious cover that would be added to the installation. This would represent development of approximately 75 percent of the developable land on Altus AFB, a 17 percent increase in the amount of facility space, and a 13 percent increase in impervious cover on the installation. For comparison purposes, and as stated above, the development defined in the PDA would incorporate the construction, renovation, and demolition activities defined in the Proposed Action as well as the broader installation expansion. Table 2-4 provides a comparison of the development for each alternative.

Table 2-4 Comparison of Installation Development Alternatives

Alternative	Renovation (SF)	Demolition (SF)	Construction (SF)	Additional Infrastructure (SF)	Removal of Pavement and Roadways (SF)	Additional Facility Space (Acres)	Impervious Cover (Acres)
Proposed Action	36,541,720	119,617	235,734	1,195,450	553,820	5.8	17.4[a]
PDA	36,541,720	119,617	695,538	1,195,450	553,820	16.0	93[a]
No-action Alternative	0	0	0	0	0	0	0

Note:
PDA = Potential Development Alternative
SF = Square Feet
[a] Impervious cover includes facility footprint and associated hard surfaces, and is based upon a development intensity factor derived from an analysis of current installation development patterns (i.e., parking, sidewalks, and driveways).

The overall developable land on Altus AFB as defined in the Capability Analysis (Appendix B) consists of 512 acres. These areas do not have any environmental or developmental constraints.

Under the PDA, development would occur only on developable land that did not possess land-use compatibility constraints or was free from environmental constraints. Land-use compatibility constraints include: Safety Quantity-Distance Arcs, Small Arms Range Safety Zones, and a 150-foot anti-terrorism/force protection buffer zone along the installation perimeter. Environmental constraints include areas designated as wetlands or within the 100-year floodplain and Environmental Restoration Program (ERP) Sites/Areas of Concern.

2.5.1.3 Personnel and On-base Residents

An additional 426 personnel and dependents would be added under the PDA, resulting in a total end state installation population of 5,773 personnel. This would be an eight percent increase over the current population. Under the PDA, all of the incoming personnel would live on base.

2.6 OTHER ACTIONS ANNOUNCED FOR ALTUS AFB AND SURROUNDING COMMUNITY

This EA also considers the effects of cumulative impacts (40 CFR 1508.7) and concurrent actions (40 CFR 1508.25[1]). A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Other actions announced for Altus AFB and the City of Altus that could occur during the same time period as the proposed or alternative actions are identified below. The descriptions also include the estimated total square feet of construction and demolition associated with each project.

- Military Family Housing Privatization - The Air Force proposed to privatize MFH at Altus AFB by entering into a real estate transaction with a private developer to plan, design, develop, demolish, construct, renovate, replace, own, operate, maintain and manage the MFH for military personnel for a period of 50 years. Privatization includes conveyance of 965 MFH units to a private developer for a period of 50 years beginning in FY2005. All of the utility lines (water, sewer, and gas mains and laterals) in the housing areas will also be conveyed to the privatization contractor. The Government will retain ownership of the underlying land and lease it to the private developer.

- Southwest Oklahoma Aviation Renaissance Airpark at Altus, Oklahoma - The purpose of the proposed Renaissance Airpark is to begin aviation-related industrial development with the goal of improving the local economy, job growth, and the overall quality of life for all the citizens of Altus, including the military population of Altus AFB. This would be a joint venture between Altus AFB and the City of Altus. The hangars, facilities, and ramp proposed for construction would provide the support facilities needed to establish

the Renaissance Airpark. In partnership with the City of Altus' Economic Development Board, the proposed action would enable Altus AFB to support the Renaissance Airpark initiative.

For this analysis, the actions identified above are addressed from a cumulative perspective and are analyzed in Chapter 4. Given the construction or completion timeframe for each effort, the projects would not be incorporated into the baseline; and, they are not part of the Proposed Action or alternatives. More specifically, the land defined for each of the projects above was not considered to be in developable areas on the installation. Therefore, the parcels associated with each action were not considered when defining either the Proposed Action or the PDA. All of the actions identified above have been evaluated under separate NEPA cover and were incorporated in this analysis for their cumulative value.

2.7 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table 2-5 summarizes the impacts of the Proposed Action, PDA, and the No-action Alternative.

2.8 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is the Proposed Action.

2.9 MEASURES TO MINIMIZE IMPACTS

Table 2-6 presents measures to minimize or reduce impacts and best management practices (BMPs) anticipated for impacts incurred under the Proposed Action, PDA, and the No-action Alternative.

Table 2-5 Summary of Environmental Impacts

Resource	Proposed Action Implement Capital Improvement Projects and Related Mission Activities	Potential Development Alternative	No Action Alternative
Airspace Use and Management	No change to sortie counts or flight operations; therefore, no impacts to airspace use and management.	No change to classification of Altus AFB as Class D airspace. No restriction of other air traffic in the vicinity of Altus AFB. No need for additional or new controlled airspace or special use airspace.	No change.
Noise	Very slight reduction in aggregate acreage predicted to be exposed to noise levels in excess of 65 dB DNL. Noise level increase from aircraft operations would be below perceptible levels. Increased noise from construction and demolition activities may temporarily cause short-term, localized speech interference or annoyance near construction zones. Noise-sensitive receptors would be exposed to construction noise intermittently, and only for the duration of the project.	Substantial increase in the number of acres underlying the 65 dB DNL noise contours; however, noise level increase from aircraft operations would be below perceptible levels. Impacts from construction related noise would be similar to, but longer in duration than the Proposed Action.	No change.
Land Use	No on- or off-base impacts to land use from flight operations or construction and demolition activities.	Long-term increase in noise from increased air operations would not likely be perceptible to human receptors. Long-term change to land-use categories from open space to other land-use categories. No impacts to land-use compatibility. The 65 dB DNL contour would shift westward and slightly off the installation in the southwest corner of the base. The contour already extends off-installation to the north, south, and east. No off-base impacts to land use from construction activities.	No change.
Air Quality	No increase in long-term emissions as there would be no changes in facility mission, operations, or vehicle use. Long-term air emissions would be reduced due to updated controls in new buildings. No change to stationary source emissions. Combustion of fuel by construction equipment would cause a short-term increase in criteria pollutants. Fugitive dust would be created by construction equipment but would be short-term. All emissions would fall below the ten percent level that would be considered regionally significant if the region were in nonattainment status for any criteria pollutants.	Short-term impacts would be similar to those in the Proposed Action. Long-term increase in emissions from government and personally-owned vehicles, as well as 57 percent increase in aircraft operations.	No change.
Earth Resources	There would be short-term soil disturbance as a result of proposed construction and demolition activities. The soils in the vicinity of the proposed construction projects at Altus AFB have been altered over time, and the project areas have been permanently disturbed by existing facilities and paved roads.	Impacts would be similar to those in the Proposed Action; however, construction would occur on more of the developable land at Altus AFB, including some areas not previously disturbed. No changes to topography are expected.	No change.
Biological Resources	No impacts to listed plant species or species of concern. Decrease in habitat for wildlife, but relocation to suitable habitat is expected. Noise from construction activities, increased traffic, and earth moving activities could potentially temporarily disturb wildlife near the construction areas. This disturbance is expected to be short-term and minor	Impacts would be similar to those in the Proposed Action. No impacts to biological resources from increased aircraft operations.	No change.
Cultural Resources	Proposed demolition and construction within the cantonment area would have no effect on archaeological or historic properties. SHPO concurrence with determination of no-effect would be needed.	Impacts to archaeological and historic resources would be the same as for the Proposed Action.	No change.
Water Resources	Short-term increase in sediment loading of surface water. No change to groundwater quality; however, potential decrease in groundwater recharge due to increase in impervious cover. No impacts to floodplains.	Impacts to surface water would be the same as the Proposed Action, except that sediment loading would be increased due to increase in impervious cover. Also, there would be an increase in surface water demand due to population increase and subsequent increase in potable water demand. Impacts to groundwater would be the same as the Proposed Action, except that recharge rates would be further decreased from an increase in impervious cover. No impacts to floodplains.	No change.
Hazardous Materials and Wastes	Positive, long-term impact due to removal of asbestos-containing material and lead-based paint from existing facilities, as well as pesticide-contaminated and lead-based paint contaminated soil prior to demolition. No negative short- or long-term impacts to hazardous waste. No impacts to active Environmental Restoration Program or Military Munitions Response Program sites.	Impacts would be the same as for the Proposed Action, except that there would be a long term increase in the hazardous waste stream associated with new aircraft maintenance and industrial facilities.	No change.
Safety	Short-term increase in potential for accidents due to change in traffic and use of construction equipment.	Impacts would be the same as for the Proposed Action, except that because construction may occur on undeveloped property that is not used for daily military activities, accidents may be less likely to involve military personnel. Also, there would be a long-term increase in the potential for more traffic accidents to occur as a result of the increase in population.	No change.

Table 2-5 Summary of Environmental Impacts (Continued)

Resource	Proposed Action Implement Capital Improvement Projects and Related Mission Activities	Potential Development Alternative	No Action Alternative
Infrastructure and Utilities	Long-term increase in potable water consumption, wastewater generation, and electricity and natural gas consumption from facility related usage. Short-term increase in potable water from dust suppression activities during demolition and construction. Short-term increase in solid waste generation from construction and demolition activities. Long-term increase in storm water runoff, but no impact to drainage system capacity. Short-term increase in traffic counts during construction and demolition activities. Potential impacts to road conditions from continued heavy equipment traffic.	Impacts would be the same as for the Proposed Action, except that there would be an additional long-term increase in potable water consumption, wastewater generation, solid waste generation, traffic, and electrical and natural gas consumption from an increase in personnel and additional facilities construction.	No change.
Socioeconomic Resources	No change to population, housing or local school enrollment. Temporary increase in local expenditures due to construction and demolition activities.	Long-term increase in local population; however, the increase would fall within the projected growth rate for Jackson County. Long-term increase in accompanied housing and unaccompanied housing requirements on base. Increase in area school enrollment. It is expected that the school district would be able to support the increase in children associated with the Potential Development Alternative. Short- and long-term increase in local expenditures due to construction and demolition activities and increased population.	No change.
Environmental Justice	No adverse impacts associated with the proposed or alternative actions; therefore, there are no disproportionate adverse impacts to minority or low-income populations.	Impacts are the same as the Proposed Action.	No change.
Notes: AFB- Air Force Base dB – decibel DNL – Day-Night Average Sound Level			

Table 2-6 Summary of Measures to Minimize Impacts

Resource	Measures to Minimize or Reduce Impacts and BMPs
Airspace Use and Management	No mitigation measures are necessary. The Air Force would continue to publish and distribute Mid-Air Collision Avoidance guides to pilots containing information on preferred flight tracks, operational characteristics of high-performance military aircraft, and, points of contact to ascertain real-time status of Special Use Airspace.
Noise	Altus AFB tends to reduce adverse noise effects and annoyance in that less than ten percent of flight operations and ground engine runs occur between 10:00 pm and 7:00 am. Best Management Practices (BMPs) include restricting the operation of extremely noisy equipment (e.g., brick cutters or jackhammers) before 9:00 am and after 5:00 pm. Other practices to reduce construction-associated noises and disturbances include utilizing properly operating and maintained equipment (e.g., possessing mufflers, gaskets, sharpened and lubricated blades), maximizing the distance of loud equipment from a residence, directing equipment to use less noise-sensitive routes, fitting silencers to combustion engines, fastening machinery covers or panels tightly, isolating vibrating parts and damping, constructing sound barriers to reduce propagation, or shutting off or idling machinery between work periods.
Land Use	Altus AFB tends to reduce adverse noise effects and annoyance in that in that less than ten percent of flight operations and ground engine runs occur between 10:00 pm and 7:00 am. After the aircraft operation increase, an updated AICUZ study would be prepared and updated noise contours and compatible land-use planning recommendations would be furnished to the adjacent municipalities.
Air Quality	No mitigation measures are necessary. BMPs to minimize fugitive dust emissions would include watering the disturbed construction area, covering dirt and aggregate trucks and/or piles, preventing dirt carryover to paved roads, and using erosion barriers and wind breaks.
Earth Resources	No mitigation measures are necessary. Proposed construction projects would include site-specific sediment and erosion control plans that detail BMPs to prevent soil disturbance, capture and contain loose soil, and slow the movement of storm water during heavy rains. Fugitive dust from construction activities would be minimized by watering and soil stockpiling, thereby reducing the total amount of soil exposed to wind.
Biological Resources	If the PDA were implemented, restoration and enhancement of vegetative communities to their historical state would continue to ensure suitable and diverse habitat for displaced wildlife. For all alternatives, a SWPPP would be implemented to reduce sediment runoff affecting habitat and species living in receiving waters.
Cultural Resources	No mitigation measures or BMPs are necessary.
Water Resources	No mitigation measures or BMPs are necessary for surface water, groundwater, or floodplains. Proposed construction projects would implement the base-wide and where necessary, site-specific SWPPPs. Installation of water saving devices in new construction would minimize impacts to surrounding communities who utilize surface water. Utilization of porous pavement and maintaining plants with a deep root system would help to increase the amount of water infiltrated into the groundwater system. To reduce impacts to floodplains, project planning would include creating engineering controls and procedures that limit the amount of disturbed material and modification to the existing elevations.
Hazardous Materials and Wastes	No mitigation measures are necessary. In the unlikely event groundwater was encountered, care would be taken during demolition and construction activities to ensure that groundwater resources are protected from contamination and that workers are protected from contaminated groundwater.
Safety	No mitigation measures are necessary. Construction contractors would develop and implement safety plans for each construction project.

Table 2-6 Summary of Measures to Minimize Impacts (Continued)

Resource	Measures to Minimize or Reduce Impacts and BMPs
Infrastructure and Utilities	No mitigation measures are necessary. Implementation of water and energy saving devices in new facilities and recycling of construction, demolition, and renovation wastes would help to offset utility consumption and solid waste generation.
Socioeconomic Resources	No mitigation measures or BMPs are necessary.
Environmental Justice	No mitigation measures or BMPs are necessary.
Notes: BMP – Best Management Practices	

Chapter 3

Affected Environment

CHAPTER 3
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the current conditions of the environmental resources, either manmade or natural, that would be affected by implementation of the Proposed Action or alternatives. Section 3.3 focuses on the conditions at Altus AFB and, where applicable, of the surrounding community. The baseline conditions presented in this chapter are described to the level of detail necessary to support analysis of potential impacts presented in Chapter 4, Environmental Consequences.

3.2 INSTALLATION LOCATION, HISTORY, AND CURRENT MISSION

Altus AFB is located within the City of Altus, Oklahoma, approximately 60 miles west of Lawton, Oklahoma and 15 miles north of the Texas/Oklahoma border. The City of Altus is the county seat of Jackson County. Altus AFB occupies approximately 6,593 acres of land and utilizes two runways and one assault strip (USAF 2003).

Altus Army Air Field was established during World War II as an advanced flying school. In 1945, the field was inactivated and was deeded to the City of Altus in 1948 for use as a municipal airport. During the Korean War, the installation was reactivated as Altus AFB and flew B-47s and KC-97s until 1958 when they were replaced with B-52s and KC-135s (USAF 2003). In the 1950s, B-52 aircraft moved to Dyess AFB, Texas (USAF 2007b). In 1969, a new mission to train C-141 and C-5 aircrew was transferred to Altus AFB from Tinker AFB in Oklahoma City. In the early 1990s, the Military Aircraft Command, Tactical Air Command, and Strategic Air Command were replaced by the Air Mobility Command and Air Combat Command. Additionally, the Air Training Command and Air University were replaced with the Air Education and Training Command. Around this time, the newly created 97th Air Mobility Wing replaced two existing units at Altus AFB and transferred ownership of their KC-135s to a unit at Robins AFB, Georgia. In 1995, Altus AFB received the KC-135 Combat Training School from Castle AFB, California. Altus AFB received the first C-17 in March 1996 and C-17 aircrew training soon commenced (USAF 2003). On 28 July 2001, the C-141 was released from active duty and transferred to the capable hands of the USAF Reserve. In mid-July 2007 the final Altus C-5 departed Altus AFB (USAF 2007b).

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.3.1 <u>Airspace Use and Management</u>

3.3.1.1 Definition of Resource

Airspace use and management addresses how and in what airspace the aircraft operating at Altus AFB would fly. This section of the EA examines the rules, regulations, and procedures to permit the military aircraft to operate safely among all aircraft in the National Airspace System.

Airspace management and use is interrelated to other resources and topics including, but not limited to: safety, land use, noise, air quality, and biological resources.

3.3.1.2 Characteristics of Airspace

The Federal Aviation Administration (FAA) has primary jurisdiction over the management of airspace. They classify airspace based upon whether it provides Air Traffic Control (ATC) separation within it or not–controlled versus uncontrolled airspace. In addition, the FAA designates Special Use Airspace (SUA) when it removes a volume of airspace from the public domain, excluding other users and allocating it for the benefit of a particular category of user, such as the military. Figure 3-1 provides an overview of the SUA and ATC airspace at Altus AFB and the vicinity.

3.3.1.2.1 Controlled Airspace

Controlled airspace, as shown in Figure 3-2 for Altus AFB and the vicinity, is airspace of a defined, particular geographic dimension within which the FAA may exercise ATC and provide separation services to certain participating aircraft. Controlled airspace is a generic term encompassing five classifications that correlate to the level of service provided, and degree of regulation imposed (i.e., whether receipt of ATC service and compliance with ATC clearances is mandatory or voluntary). Among the classifications, there are varying levels of minimum weather requirements (in-flight visibility and cloud ceiling heights), minimum airmen certification ratings, required aircraft equipment, and required communications. Most airspace higher than 1,200 feet above ground level (AGL) is controlled airspace and in the vicinity of busier airports, controlled airspace extends all the way to the surface. The airspace immediately surrounding and over Altus AFB is Class D airspace. A control tower and a radar approach/departure control facility provide certain aircraft separation services. Pilots must establish two-way radio communications with ATC when operating within this class of airspace. Above Altus AFB's Class D airspace is Class E airspace which begins at the upper altitude of the Class D airspace and extends upward to 17,999 feet above mean sea level (MSL). This airspace represents the least restricted end of the controlled airspace continuum; only aircraft operating under Instrument Flight Rules (IFR) must obtain an ATC clearance and the separation provided is only from other IFR traffic. From 18,000 MSL upward, the airspace is classified as Class A. Within this airspace all aircraft must operate under IFR and on an ATC clearance. Positive control of all aircraft movement is therefore exercised by ATC and all aircraft are separated from each other.

Although not an airspace classification, selected airports in the U.S. have defined Terminal Radar Service Areas (TRSA) of a defined shape and volume. A TRSA is non-regulatory in that participation by aircraft operating under VFR is voluntary; however, by participating in TRSA services, VFR traffic receive traffic advisories and sequencing at altitudes and distances greater than would be provided within the Altus Class D airspace. The Altus TRSA extends outward approximately 15 nautical miles (NM) from the airfield, excluding the western side, and upward to 7,000 feet above MSL.

3.3.1.2.2 Uncontrolled Airspace

Uncontrolled airspace also has a particular geographic dimension. Unlike controlled airspace, its metes and bounds are not published; rather, it is what remains of the entire navigable airspace in those areas where controlled airspace has not been designated. The FAA may not provide separation service within uncontrolled airspace and, thus, the minimum required weather, airman certification ratings, equipment, and communications are less restrictive. This airspace exists at the surface of the earth in rural areas and many smaller general aviation and military airfields lie within uncontrolled airspace. No particular clearance or communications requirement exist for operations within uncontrolled airspace. The FAA has designated only one type of uncontrolled airspace, Class G.

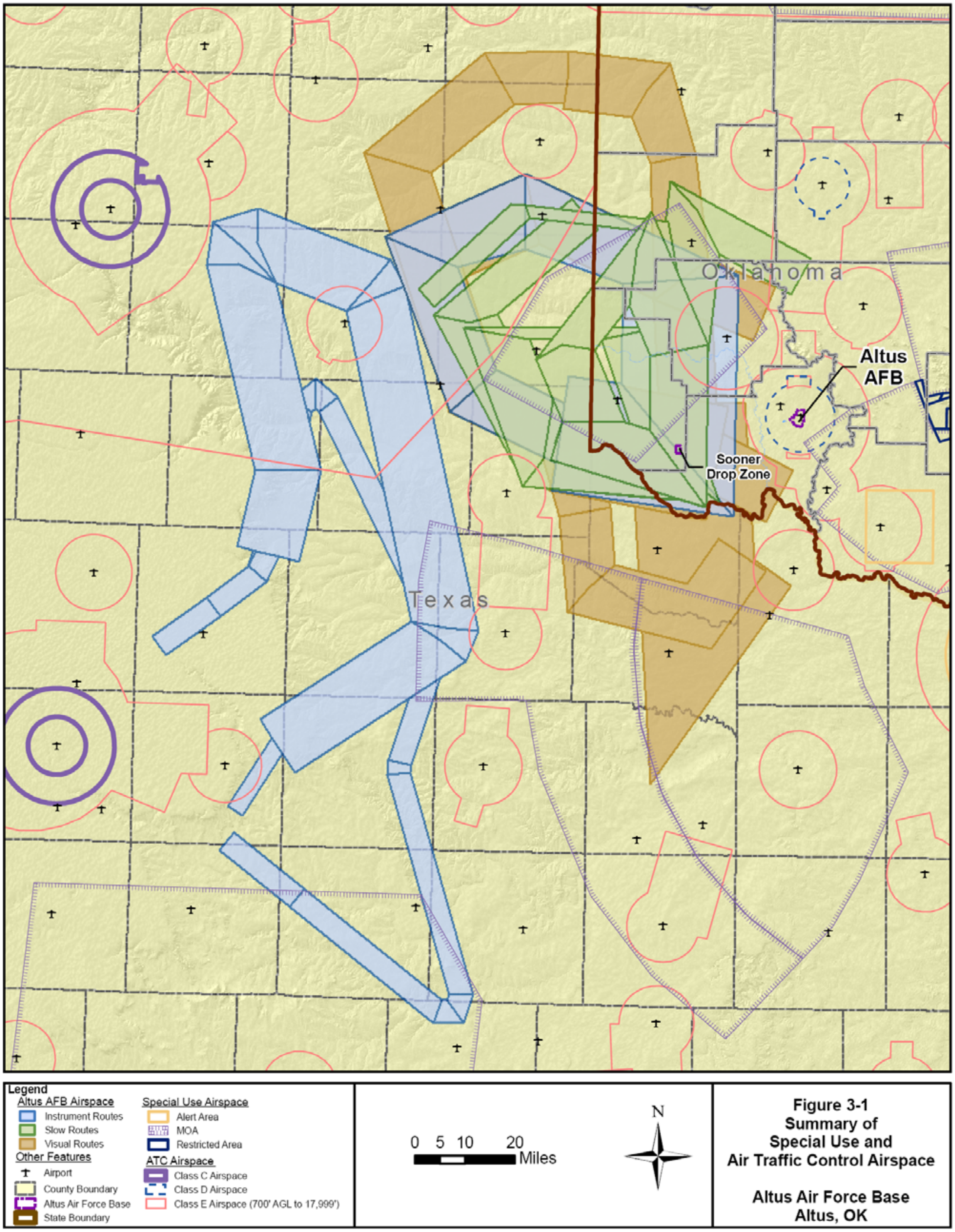


Figure 3-1
Summary of Special Use and Air Traffic Control Airspace
Altus Air Force Base
Altus, OK

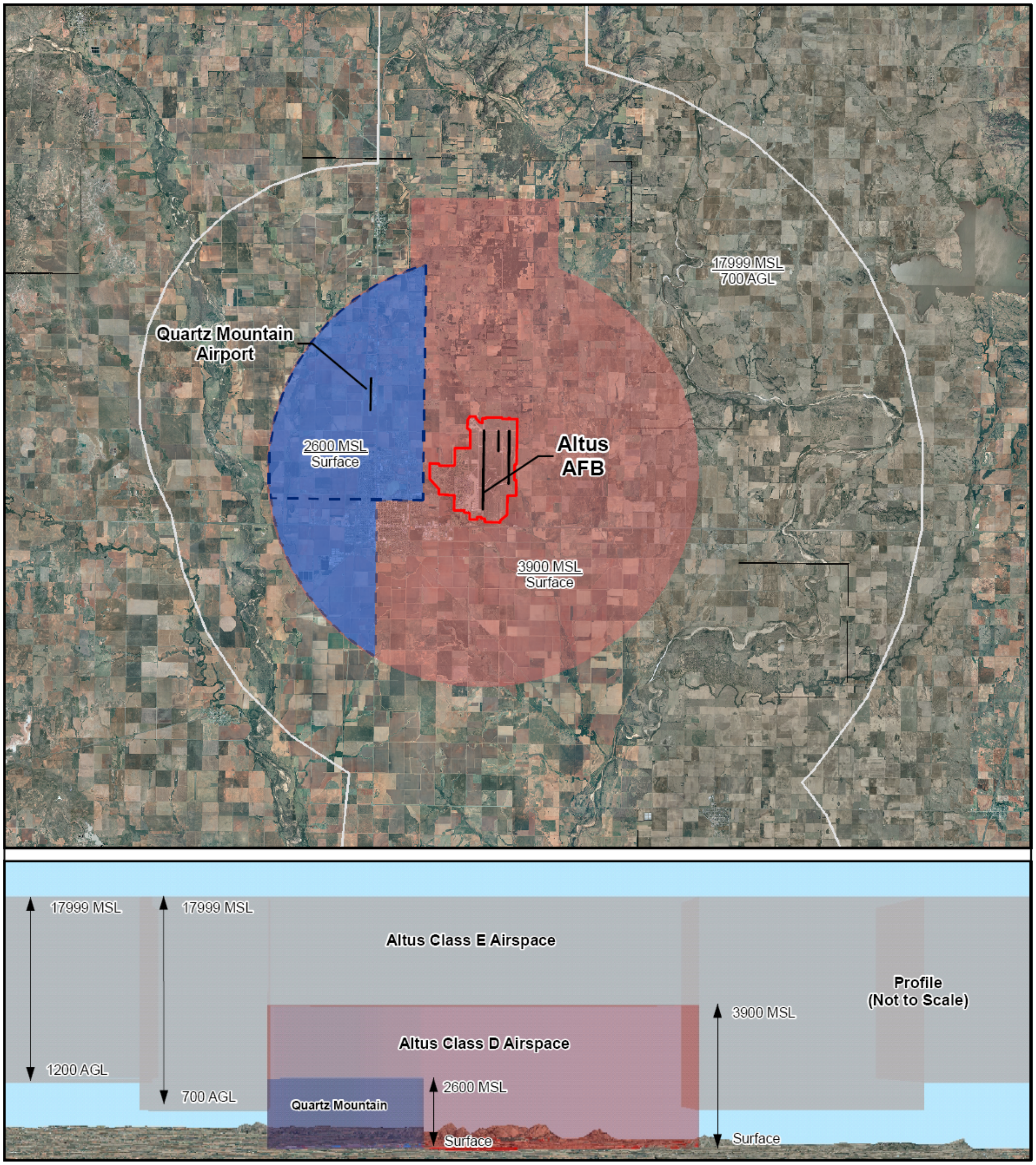


Figure 3-2

Altus AFB Controlled Airspace

Altus Air Force Base
Altus, OK

3.3.1.2.3 Special Use Airspace

SUA, shown in Figure 3-1 for Altus AFB and the vicinity, is a generic term for airspace that has a particular geographic dimension that has been designated either to contain particular hazardous activities or to exclude non-participating aircraft, or both.

Unlike airspace within which separation services are provided (i.e., controlled versus uncontrolled), SUA is established for a different purpose: to disclose to pilots that activities (e.g., artillery ranges) or flight operations (usually military) are occurring within a particular geographic area and restrict to varying degrees flight operations by aircraft not participating in those activities. SUA is also established to protect high-value assets of national significance on the ground.

Restricted Areas (R-Areas) and Military Operations Areas (MOAs) are two examples of SUA. The geographic limits of a given SUA do not correlate to whether airspace is controlled or uncontrolled. Within a MOA, non-participating IFR traffic is rerouted around the MOA for those periods that the airspace is active. Traffic operating under VFR is not restricted; however, MOAs are charted and pilots are strongly encouraged to avoid active MOAs because the activities occurring therein (acrobatics, formation flights, etc.) do not mix well with civilian air traffic. Within R-Areas, the activities are hazardous to any non-participating traffic and therefore that traffic is not permitted entry during those times the R-Area is active.

In addition to SUA as defined above, the military coordinates with the FAA to delineate and disclose linear training routes. The Military Training Route (MTR) program was developed in the interest of achieving a greater level of safety. Along these linear corridors, military aircraft may conduct low-level, high speed training in a fashion that otherwise would not be permitted under the Federal Aviation Regulations (i.e., at speeds in excess of 250 knots below 10,000 MSL). The two main types of MTRs are Visual Routes (VR) and Instrument Routes (IR), the principal difference between the two being whether flight operations along them are conducted under VFR or IFR. The metes and bounds of these routes are published and their general outline is shown on aeronautical charts available to civilian users.

A similar series of linear routes, called Slow Routes (SR), are developed by the military for training purposes as well. Unlike an MTR, high-speed activities are not conducted along a SR. These routes, which are usually locally produced, not necessarily published, and are not charted are developed to facilitate military training that is consistent with non-military flight operations occurring generally within the airspace.

3.3.1.3 Region of Influence

The Region of Influence (ROI) for airspace includes Altus AFB and the vicinity, as well as the military training airspace within which the military aircraft stationed there regularly fly. This airspace includes the area around Altus AFB and MTR associated with and scheduled by the 97 Air Refueling Wing (ARW).

The Proposed Action involves aircraft operations in the Class D terminal airspace setting. The Altus AFB Class D airspace extends outward on a 6-NM radius from the center of the airfield

and extends upward from the surface up to 3,900 MSL. In addition, the 97 ARW owns land 20 NM southwest of the base (Figure 3-1). This land, the Sooner Drop Zone (DZ), lies within uncontrolled (Class G) airspace. A DZ is essential for loadmaster training.

Altus assigned C-17 aircraft use IRs, VRs and SRs above the Sooner DZ to conduct tactical aerial cargo delivery. The IR and VR MTR allow aircraft to conduct flight training below 10,000 feet MSL in excess of 250 knots. Unlike IR and VR MTRs, SRs are low level routes at or below 1,500 feet AGL at airspeeds below 250 knots. The routes vary in length and width and extend outward overland approximately 150 NM.

With respect to ATC airspace, the ROI for this action is the area that is within approximately 20 miles of the airfield. With respect to SUA or training airspace, the ROI is generally within 150 NM of Altus AFB.

3.3.1.4 Altus AFB and Vicinity

Figure 3-3 depicts the airfield at Altus AFB and Figure 3-1 shows the airspace and airports within the vicinity of the base. Altus AFB is the primary airport for which the Class D airspace was created.

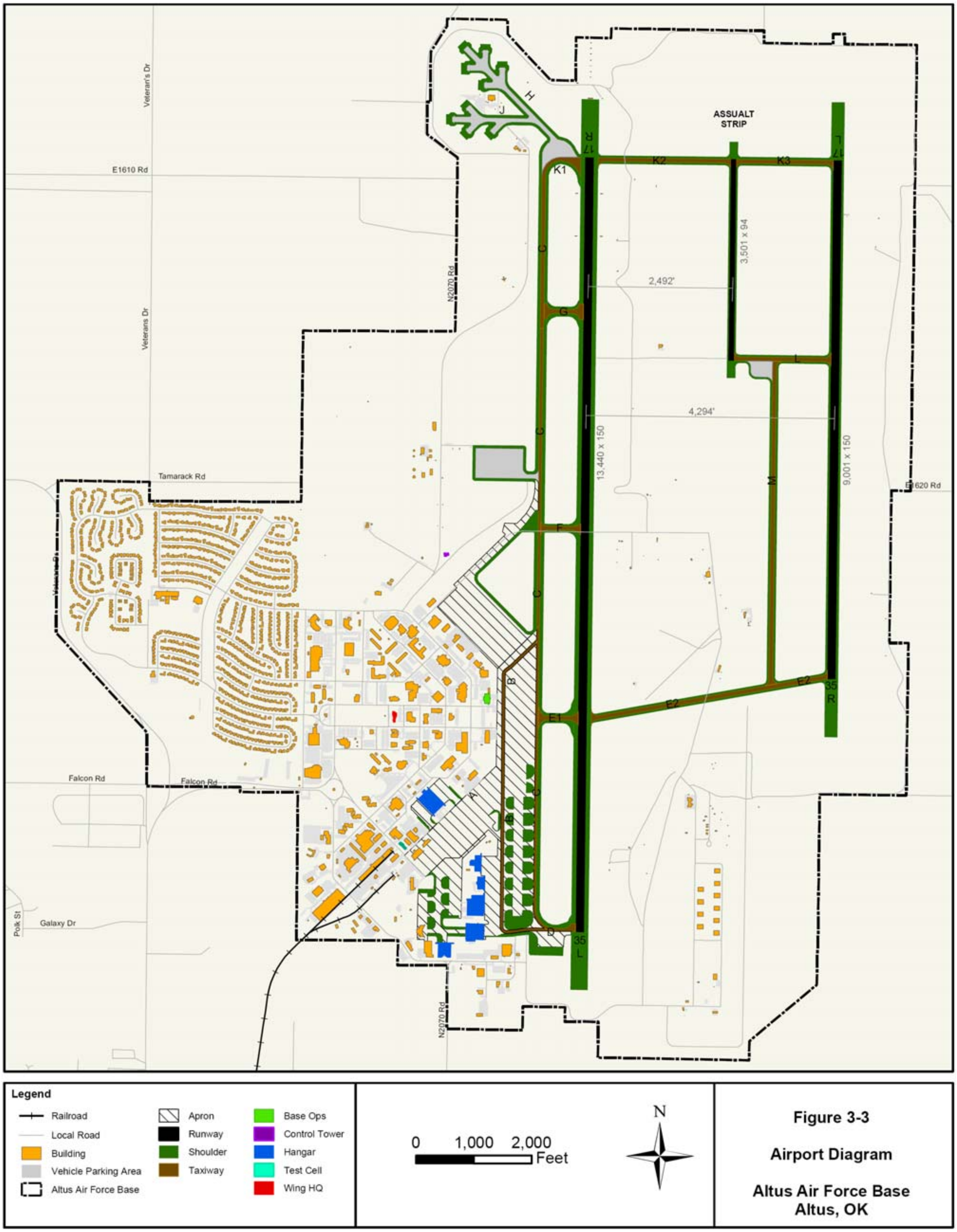


Figure 3-3

Airport Diagram

Altus Air Force Base
Altus, OK

Altus AFB lies in southwestern Oklahoma in a region with moderate military and civilian air traffic. Within a 75-mile radius of the Base, the region has a high concentration of military and general aviation airports. The Will Rogers World Airport in Oklahoma City is located 93 NM northeast of Altus AFB, and is an air carrier airport with significant passenger planes. The closest airport to Altus lies four NM northwest of the Base, the Altus/Quartz Mountain Regional airport. This airport lies within the Altus Class D airspace. A Letter of Procedure (LOP) allows general aviation users to transition a portion of the Altus Class D airspace without necessity of obtaining a clearance first, as is usually the case for aircraft movements within Class D airspace (Figure 3-2). The LOP is beneficial to operators at both airfields as it improves operational efficiency for repetitive, routine flight operations.

The airspace setting in the vicinity of Altus AFB is moderately complex, largely due to the considerable SUA assets used by the military and the presence of a civilian airport within the Altus AFB Class D airspace. In addition to the base and Altus/Quartz Mountain Regional, other significant military airfields (Sheppard AFB, Henry Post Army Airfield), air carrier (Sheppard AFB/Wichita Falls Municipal, Lawton-Ft. Sill Regional Airport), and numerous private airfields with paved and unpaved runways exist in the region (FAA 2008a). Table 3-1 presents selected military and public use airfield data.

Table 3-1 Selected Public Use and Military Airports within the ROI for Altus AFB

Name	ID	Surface Airspace	2007 Operations Count	Distance from Altus AFB	IFR Approach Type	Longest Runway (feet)
Altus AFB	KLTS	Class D/E	159,336	N/A	Precision	13,440
Altus/Quartz Mountain Regional	KAXS	Class G	14,000	4 NM Northwest	Precision	5,501
Frederick Municipal Airport	KFDR	Class G	63,700	23 NM Southeast	Precision	6,099
Clinton-Sherman Airport	KCSM	Class D/E	49,500	40 NM North	Precision	13,503
Henry Post Army Airfield	KFSI	Class D/E	186,217	42 NM East	Precision	5,000
Lawton-Ft Sill Regional Airport	KLAW	Class D/E	50,724	43 NM East	Precision	8,599
Sheppard AFB/Wichita Falls Municipal Airport	KSPS	Class D/E	115,338	55 NM Southeast	Precision	13,101
Will Rogers World Airport	KOKC	Class C	119,401	93 NM Northeast	Precision	9,802
Tradewind Airport	KTDW	Class C	32,790	129 NM Northwest	Precision	5,098
Dallas/Fort Worth International Airport	KDFW	Class B	513,055	154 NM Southeast	Precision	13,401
Source: FAA 2008a, FAA 2008b, and USAF 2007a						

The airfield at Altus AFB, with approximately 159,000 annual operations, would not be viewed as busy compared to the major air carrier airports in the country in terms of its annual aircraft

operations counts. For comparison, the 59th busiest airport in 2008 was Sacramento International with approximately 154,000 annual operations.

The airfield at Altus AFB consists of two parallel runways (Figure 3-3). Runway 17R/35L is the innermost or inside runway (with respect to the aircraft parking ramps and hangars). Runway 17R/35L is the primary runway, to which transient aircraft and most instrument arrivals occur. Accordingly, a variety of aircraft types use this runway and during periods of less favorable weather conditions, it becomes the preferred runway.

Runway 17L/35R is the outermost runway (again, with respect to the aircraft parking and hangars) and is shorter than the inner runway. The runways are each 150 feet wide and from centerline to centerline the distance separating them is 4,294 feet. Additionally, between the two parallel runways lies a paved assault strip (Runway 17A/35A) for use in training cargo aircraft in operating at austere airstrips. The assault strip lies somewhat closer to the outside runway; the distance between it and Runways 17R/35L and 17/L/35R is 2,492, and 1,802 feet, respectively.

The Altus Class D airspace is designed to accommodate the military training mission performed by the 97 Air Mobility Wing (AMW). The Class D airspace extends upward from the surface up to, and including 3,900 feet above MSL, and extends outward six NM radius from the airport center reference point (Figure 3-2). The Altus AFB Radar Approach Control (RAPCON) provides sequencing services to participating VFR aircraft and arrival and departure control services (aircraft separation) to IFR aircraft.

3.3.1.5 Military Training Airspace

The 97 AMW primarily use the Altus Class D airspace to execute their flight training syllabus. Student pilots practice IFR/VFR arrival and departure procedures to the parallel runways and tactical takeoffs and landings to the center assault runway.

The SUA and training (MTR, SR) airspace managed by the 97 AMW provides low level tactical training to C-17 aircrews. These routes begin approximately 15 NM west of the base and extend outward approximately 150 NM. The IR and VR MTR airspace extend upward from the surface up to 5,000 feet above MSL and vary in width. The SR MTR airspace begins at 300 feet AGL and extends to 1,500 feet AGL and also varies in width (Figure 3-1). The Surface Danger Zone (SDZ) is located approximately 20 NM southwest of the Base. Although airspace above the SDZ is uncontrolled (Class G), most of the MTRs managed by Altus AFB have segments above the Sooner DZ. The Sooner DZ and MTRs provide pilots and loadmaster students training for low level aerial cargo delivery. Other charted SUA airspace in the Altus ROI includes several MOAs, R-Areas, Alert Areas, and MTRs managed by other DoD agencies (Figure 3-1).

3.3.2 Noise

3.3.2.1 Definition of Resource

Noise is defined as a sound that, if loud enough, can induce hearing loss or is otherwise undesirable because it interferes with ordinary daily activities, such as communication or sleep. A human's reaction to noise varies according to the duration, type, and characteristics of the

source; distance between the source and receiver; receiver's sensitivity; background noise level; and time of day. To quantify noise and describe its effects on the natural and human environment, a basic description of sound terminology is presented.

Sound is a series of vibrations (energy) transmitted through a medium (such as air or water) that are perceived by a receiver (e.g., humans). It is measured by accounting for the energy level represented by the amplitude (volume) and frequency (pitch) of those vibrations and comparing that to a baseline standard. As a sound wave moves through the atmosphere, a temporary increase in pressure occurs; it is the atmospheric pressure change that is detected as sound. The magnitude of the pressure change is the loudness and the frequency of the temporary changes is the pitch. The human ear can detect pressure differences over a wide range of sensitivities. For example, a whisper heard two meters away creates a pressure change from standard atmospheric pressure of approximately 0.0006 Pascals, whereas an M16 rifle at the firer's ear creates a change of 1,000 Pascals. Although one event represents 1,666,666 times more energy than the other, both represent sounds that can be heard by a human ear. A method for readily comparing these vast pressure differences is to describe them in exponential rather than linear terms. This simplifies the units and more closely depicts the way humans actually perceive sound levels. The decibel (dB) is a logarithmic ratio of the increase in atmospheric pressure a sound event causes compared to a defined reference pressure, which happens to be the lowest detectible pressure recognized by the human ear (0.00002 Pascals). When using dBs to depict airborne sound pressure levels (SPLs), zero dB is the threshold of human hearing and exponential increases occur every ten dB. An event that generates 60 dB of sound is ten times louder than one that generates 50 dB. In the example above, the whisper (0.0006 Pascals) translates to 29 dB and the M16 rifle shot (1,000 Pascals) is 153 dB.

The SPL represented by a given dB value is usually adjusted to make it more relevant to sounds that the human ear hears especially well; for example, an "A-weighted" decibel (dBA) is derived by emphasizing mid-range frequencies to which the human ear responds especially well and de-emphasizing the lower and higher range frequencies. In addition to weighting based on frequency, sound levels are further differentiated by factoring in the effect of time since sound levels normally vary in intensity and are not continuous.

The building block of noise metrics used in describing aircraft noise is the A-Weighted Sound Level. It simply describes in terms of dBA a SPL at any given moment in time. From this building block, several other metrics are derived.

> The *Maximum Sound Level (*L_{max}*)* is the peak value of all the *A-Weighted Sound Levels* that occurs during a noise event. The limitation of this metric for noise (annoyance) analysis is that peak sound level without a context of duration or time of day does not adequately address annoyance. For example most would agree that a single 140 dB L_{max} event lasting three seconds (i.e. an aircraft flyover) that occurs once per day around 1:00 pm is less annoying than a 95 dB L_{max} event (a jackhammer in a construction site) that lasts for six hours, every day and begins at 10:00 pm.
>
> The *Equivalent Sound Level* (L_{eq}) reflects the average continuous sound. It is a metric that takes into account both intensity of an event and duration. The metric considers variations in sound magnitude over periods of time, sums them, and reflects, in a single

value, the acoustic energy present during a specified time period. The common time period used in averaging sound levels are 1, 8, and 24-hour periods.

The *Sound Exposure Level* (SEL) is a specific type of L_{eq} that describes a receiver's cumulative exposure over the course of an event and compresses that energy into a one-second period. For noise events whose duration is greater than one second, the SEL will be greater than the L_{max}. Conversely events with durations shorter than one second the SEL will be less than the L_{max}. SEL is a very useful metric for predicting short term activity interruption or reaction by wildlife to a noise stimulus. It is used to allow direct comparison of events having varying intensities and durations, such as an aircraft overflight, by calculating SELs of those events. The fact that SEL is a cumulative metric means that louder events have greater SELs than do quieter events and longer events have greater SELs than do shorter events.

SELs vary according to the aircraft and engine type, engine power setting, aircraft speed, and slant distance, i.e. the distance between the aircraft and the observer. It is a very useful metric for prediction of activity interruption in humans and varied physiological responses in wildlife. Use of SEL allows direct comparison between sounds with varying levels and durations by converting them to exposure levels. Table 3-2 contains SELs for aircraft at typical takeoff speeds and power settings at various altitudes directly above the listener.

Table 3-2 Sound Exposure Levels dBA[a]

Aircraft	Speed (knots)	Power	100 Ft AGL (dBA)	500 Ft AGL (dBA)	1,000 Ft AGL (dBA)	5,000 Ft AGL (dBA)
C-17	170	90% NC	111.5	104.8	98.7	81.7
KC-135	150	82.5% NF	103.4	97.9	93.0	78.7

Notes:
% = percent; Ft = feet
AGL = Above Ground Level; NC = % of maximum rated revolutions per minute measured at core
dBA = "A-weighted" decibel; NF = % of maximum rated revolutions per minute measured at Fan blades

[a] Sound levels calculated using SELCALC software; speed and power settings used are typical for takeoff for each aircraft type.

While the above metrics are useful at describing instantaneous, peak or even comparative noise events, they do not account for multiple event occurrences, the diminution of background noise during nighttime periods, or the increased annoyance expressed with events that occur during nighttime periods when many people are sleeping. Therefore an additional metric that accounts for cumulative (or repetitive) exposure, time of day, intensity and duration is used.

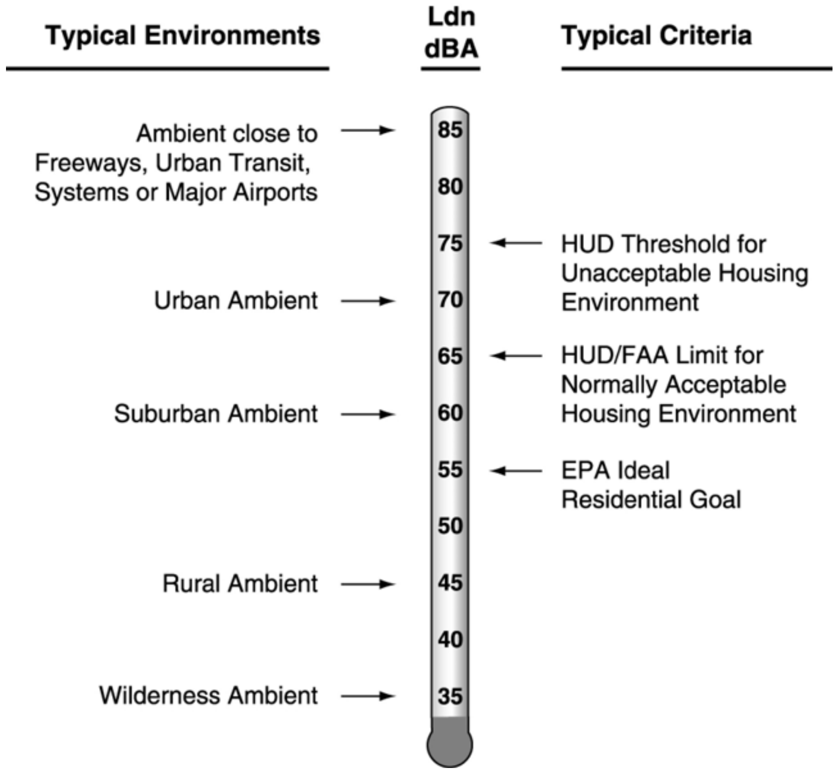
The *Day-Night Average Sound Level* (DNL) describes a receiver's cumulative noise exposure from all events occurring during a 24-hour period; events occurring between 10:00 pm and 7:00 am ("environmental night") are increased by ten dB to account for greater nighttime sensitivity to noise events. If there were no noise events occurring during the nighttime period, DNL and $L_{eq(24)}$ would be equal.

Because of the logarithmic nature of the dB, this means that a single nighttime event creates the same DNL as ten identical events during the day. The DNL is used in this assessment when

describing noise from aircraft. For temporary, intermittent noise events the L_{max} or SEL is a more useful metric and they are used for assessing the effect to the noise environment from operation of construction equipment and similar activities.

The use of these noise metrics is chosen based on federal guidelines developed in order to be able to quantify noise and the reaction of those exposed to it in a community in a sound, objective, and scientifically valid fashion. The federal government established a working group to review the science of noise and recommend standards for its agencies to use when assessing the effects from noise. The Federal Interagency Committee on Noise (FICON) reviewed the existing science on the subject of urban, industrial, and aircraft noise, land-use compatibility, and health and human safety and validated the use of DNL as the appropriate metric for describing noise from aircraft operations and assessing its effects. The DoD uses DNL as its common metric to describe noise exposure when describing and assessing noise from aircraft overflights, range operations, and other similar discontinuous but repetitive occurrences. Within the DoD, the Air Installation Compatible Use Zone (AICUZ) program that assesses noise related specifically to aircraft and range operations has been developed and adopted by its services, including the Air Force (DoD 1977). AICUZ studies assess predicted noise exposure in terms of DNL. The DNL metric has also been adopted by the U.S. Department of Housing and Urban Development, the FAA, and the United States Environmental Protection Agency (USEPA) as a common standard for assessing noise levels for compatibility with land uses, health and human safety, and effects on wildlife (See Figure 3-4).

Figure 3-4 Typical DNL Values and Goals/Criteria for Outdoor Environments



Note: Ldn is equivalent to DNL.

The DoD AICUZ program outlines compatible land uses by first predicting noise exposure zones or contours depicting lines of equal noise exposure that would result from normal operations at a particular place, and then by recommending land uses that are ordinarily considered compatible with the predicted noise exposure level for those locations contained within the noise contours (DoD 1977 and USAF 1999). In addition to assessing land-use compatibility from the perspective of noise, the DoD AICUZ program assesses accident potential and outlines compatible uses in those areas nearest to the runway ends.

The Air Force AICUZ program is that service's implementation of the DoD directive to assess and disclose noise created by operations on an installation with the goal of preventing the encroachment of incompatible uses on the surrounding areas in a way that ultimately compromises the viability of the installation. The Air Force AICUZ program predicts noise exposure by modeling aircraft operations and employing four bands of noise exposure: (1) 65 to 69 dBA DNL; (2) 70 to 74 dBA DNL;(3) 75 to 79 dBA DNL; and (4) 80 dBA DNL or more (DoD 1977 and USAF 1998). Within these bands of noise exposure, certain land uses are considered acceptable or unacceptable. For example, residential uses are normally not considered compatible with a predicted noise exposure in excess of 65 DNL and an office use is not considered compatible in an area having a predicted noise exposure greater than 80 DNL (FICUN 1980).

Specific noise exposure contours are developed for each Air Force installation that has flying activities; these contours are released to the surrounding jurisdictions to guide their land-use

planning or are used to guide facilities planning on Air Force bases. Areas below the 65 dBA DNL are typically categorized as compatible for residential use. The Air Force's policy has been to implement, if feasible, noise level reduction (NLR) measures for on-base residential and public use buildings with all new buildings being designed and constructed to comply with the appropriate NLR standards (USAF 1978).

Apart from noise associated with the operation of aircraft, federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Occupational safety and health regulations are a primary method of enforcing these guidelines and standards.

<u>Hearing Loss.</u> The potential for permanent hearing loss arises from direct exposure to noise on a regular, continuing long-term basis (16 hours a day for 40 years) to levels above 75 DNL. Based on an USEPA report (USEPA 1974), hearing loss is not expected in people exposed to 75 DNL or less. The Federal Interagency Committee on Urban Noise states that hearing loss due to noise: 1) may begin to occur in people exposed to long-term noise at or above 75 DNL; 2) would not likely occur in people exposed to noise between 70 and 75 DNL; and 3) would not occur in people exposed to noise less than 70 DNL (FICUN 1980).

<u>Noise Interference.</u> Elevated noise levels can potentially interfere with speech, cause annoyance, or disturb sleep. Annoyance resulting from noise exposure is typically measured via community surveys where the level of tolerance can vary greatly among individuals (USEPA 1974). It is estimated that 13.5 percent of the population exposed to 65 DNL would be highly annoyed, while 37 percent would be highly annoyed if exposed to a 75 DNL (USEPA 1974). Research also indicates that the "type of neighborhood" a person inhabits influences their noise annoyance level, with instances of noise complaints being greater for those living in rural areas than in suburban or urban residential areas (Schomer 2001).

Interior noise levels are typically lower than exterior levels due to the attenuation of the sound energy by the structure, with the amount of NLR provided by a building depending on the type of construction and the number of openings such as doors, windows, chimneys, and plumbing vents. The approximate reduction in interior noise is 15 dBA when windows are open and 25 dBA for closed windows (USEPA 1974).

<u>Region of Influence.</u> The region of influence for a noise assessment is a function of the type of action proposed. For the Proposed Action and its alternatives, the region of influence would primarily be the military installation itself and areas extending approximately five to seven miles into the surrounding jurisdictions of the city of Altus and Jackson County, Oklahoma.

3.3.2.2 Affected Environment

The noise environment at Altus AFB primarily consists of noise created from aircraft operations. In preparation for this document, the aircraft operations data were updated and modeled in 2008. Other sources of noise include vehicle noise, routine operation of equipment and machinery (e.g., generators; heating, ventilation, and air conditioning), and operation of construction

equipment. The effects associated with the presence of noise at Altus AFB are examined in light of their effects on land-use compatibility and human health and safety.

Aircraft Noise. The bulk of aircraft operations at Altus AFB are conducted by the 97 AMW, the installation host unit. The Air Force has extensively studied the aircraft noise environment at Altus AFB, preparing Air Installation Compatible Use Zone studies and a Joint Land Use Study with the City of Altus, OK. Prior to efforts conducted for this document, the most recent noise modeling occurred in 2001. The 2008 updated data detail the mix of aircraft types and operations conducted at Altus AFB during an average busy day. Training flights with jet engine transport/cargo aircraft (C-17 *Globemaster*, KC-135 *Stratotanker*) account for the based aircraft operations. In addition, a small number of transient aircraft stationed elsewhere use the airfield; however, these aircraft comprise less than two percent of all operations. The 2008 data update indicates that the average annual operations count of all aircraft at Altus AFB is approximately 154,000 (USAF 2008a).

The resulting predicted baseline noise exposure from approximately 154,000 annual aircraft operations for the mix of aircraft found at Altus AFB is shown as a set of noise contours that are centered about the runways. Figure 3-5 depicts the average baseline noise exposure in the general vicinity of Altus AFB. Table 3-3 details the acreage lying within each noise contour.

Table 3-3 Land Area Exposed to Elevated Noise Levels (Total and Off-Base)

Noise Level DNL	Baseline: Total Land Area (In Acres)	Baseline Land Area (Off-Base)
65 to 69	3,444.30	3,013.86
70 to 74	2,583.93	1,282.35
75 to 80	1,134.01	281.51
>80	414.46	17.37
Total	**7,576.70**	**4,595.09**
Source: USAF 2008a		

Construction Noise. Noise associated with the operation of machinery on construction sites is typically short-term, intermittent, and highly localized. The loudest machinery generally produces peak SPLs ranging from 86 to 95 dBA at 50 feet from the source (Table 3-4). For every multiple of this distance, SPL decreases by six dBA. It is important to note that the peak SPL range for construction equipment noise does not take into account the ability of sound to be reflected/absorbed by nearby objects, which would further reduce noise levels. Additionally, interior noise levels would be reduced by 18 to 27 dBA due to the NLR properties of the building's construction materials (FAA 1992).

Table 3-4 Peak Sound Pressure Level of Heavy Equipment from a Distance of 50 Feet

Equipment	Noise Generated[1]
Bulldozer	95 dBA
Scraper	94 dBA
Front Loader	94 dBA
Backhoe	92 dBA
Grader	91 dBA
Crane	86 dBA

Source: Reagan and Grant 1977

Notes:
dBA = A-weighted decibel
(1) Noise from a single source

The DNL that would result from operating construction equipment is a function of the frequency, duration, and time of day during which the activity occurs. For example, a bulldozer that generates 95 dBA at 50 feet and is operating continuously for 365 days from 6:00 am to 10:00 pm for an entire year would be operating during all 15 “day” hours and one “night” hour of the DNL metric. Absent other sources of noise (e.g., aircraft operations), such operation would create a predicted noise exposure of 64 DNL.

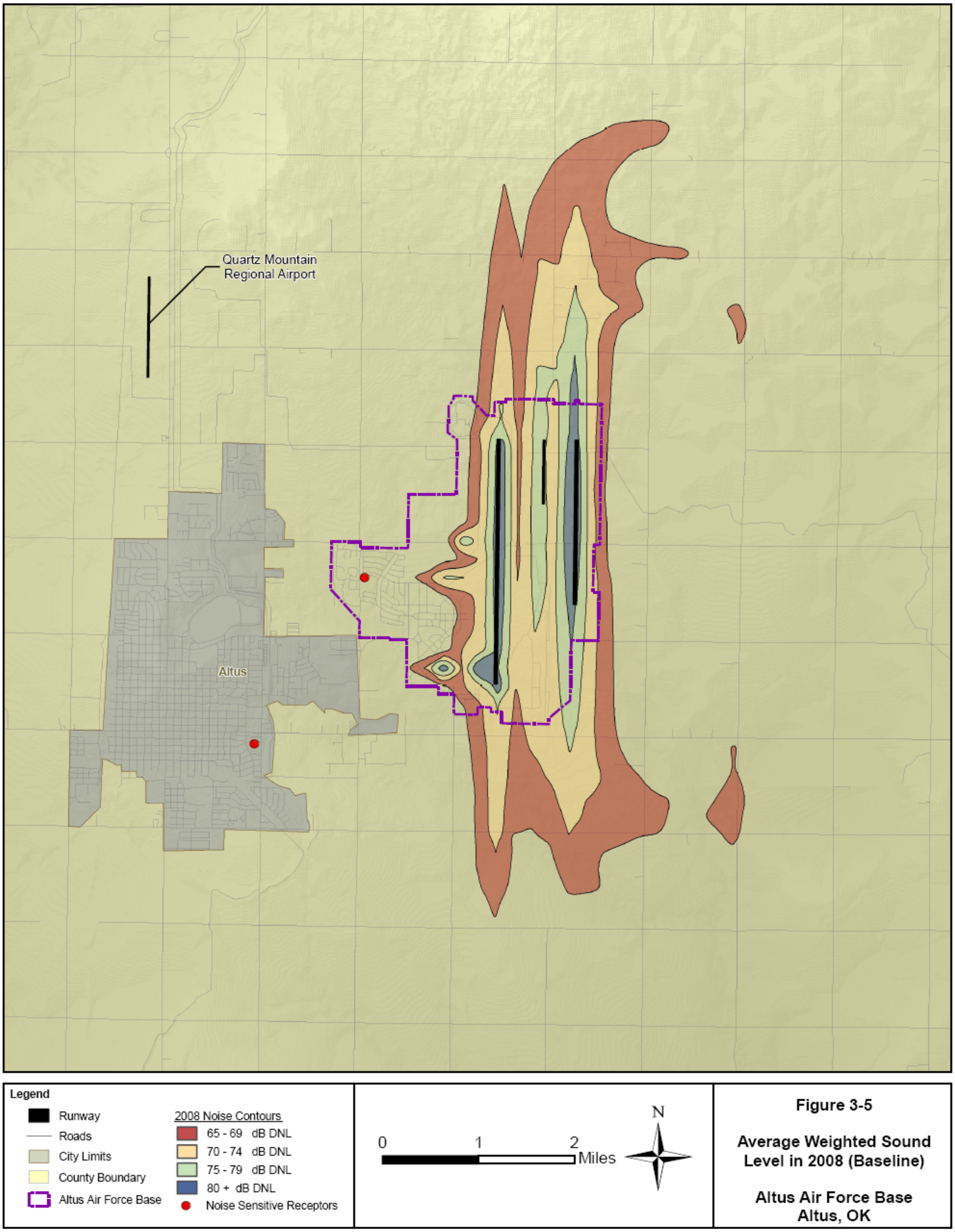


Figure 3-5

Average Weighted Sound Level in 2008 (Baseline)

Altus Air Force Base
Altus, OK

3.3.3 Land Use

3.3.3.1 Definition of Resource

Land use describes the activities that take place in a particular area and generally refers to human modification of land, often for residential or economic purposes. It also refers to use of land for preservation or protection of natural resources. It is important as a means to determine if there is sufficient area for proposed activities and to identify any potential conflicts with local land-use plans. This section of the EA describes the on- and off-base land-use resources that could potentially be affected by the implementation of the proposed or alternative actions.

3.3.3.2 Region of Influence

The ROI consists of Altus AFB and the vicinity. Off-base resources consist of lands and waterways immediately adjacent to Altus AFB and include areas belonging to the city of Altus and Jackson County. The ROI also includes the land under the airspace where the C-17 *Globemaster* and the KC-135 *Stratotanker* operate. It also includes the MTRs and SDZ managed by Altus AFB.

3.3.3.3 Altus AFB and Vicinity

Altus AFB is located on 4,069 acres in the southwest Oklahoma plains. The Base lies four miles east of the city of Altus in the northeast corner of Jackson County (Figure 1-1). The installation's location offers military pilots wide open spaces and large unconstrained blocks of airspace within which they may perform their test and training missions. This, combined with favorable weather of the region, provides an outstanding location to conduct aircraft operations.

3.3.3.4 Air Installation Compatible Use Zone Program

The Air Force provides land-use recommendations to local jurisdictions through the AICUZ program. The purpose of the program is to promote compatible land-use development in areas subject to aircraft noise and accident potential. These guidelines have been established on the basis of studies prepared and sponsored by several federal agencies, including the DoD. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. The AICUZ study is updated periodically per AF1 32-7063. Additionally, Altus AFB, the City of Altus, and Jackson County participated in a Joint Land Use Study (JLUS) (a DoD sponsored program for protecting military assets from encroachment by incompatible uses) that was completed in 1999. The last published study predates the JLUS and both were undertaken at a time when the predominant aircraft were the C-5 *Galaxy* and the C-141 *Starlifter*. Accordingly, the set of contours connecting values of equal predicted noise exposure was substantially larger than current conditions. At that time there were very few encroachments from incompatible uses in the vicinity of Altus AFB. Current noise contours extend parallel and from the ends of the runways over Altus AFB and the surrounding area. Refer to Figure 3-6 for a graphical representation of the noise contours for Altus AFB. The majority of the off-base land under the noise contours is either expected to remain as open space or remain as land used for agricultural purposes.

In addition to land use compatibility with respect to noise arising from aircraft operations, the AICUZ addresses aircraft accident potential. Statistical analysis of Air Force aircraft accidents occurring within ten NM of and spanning several decades indicates that 75 percent of said accidents occurred on or adjacent to the runway in a 3,000-foot wide corridor that extends along the runway axis to 15,000 feet from the threshold. As a result, the AICUZ program outlines land use recommendations that vary with distance from the threshold. Adjacent to the runway end is a Clear Zone, a 3,000 foot by 3,000 foot area beginning at the threshold and extending outward along the axis of the extended runway centerline. Within this area only agricultural uses are permitted and necessary airfield structures (e.g. lighting, navigation aids) must be frangible. Beyond each runway end Clear Zone are Accident Potential Zones (APZ) I and II. These areas begin at the far end of the Clear Zone and run along the extended runway centerline for 5,000 feet and 7,000 feet, respectively. Their width is the same as the Clear Zone.

Altus AFB, the City of Altus, and Jackson County, Oklahoma work collaboratively to protect the health and welfare of the surrounding community while also protecting the military mission and taxpayer's investment in Altus AFB. The specific noise exposure levels from aircraft operations in the vicinity of Altus AFB and the boundaries of the Clear Zones and APZs were most recently released to local governments for their use in planning documents as part of the 1999 JLUS study. Additional, specific information on the noise environment around Altus AFB may be found in this document in Section 3.3.2. All of the Clear Zones for the runways at Altus AFB overlie government property or open land. APZs I and II extend off base to north and south for Runway 17L/35R and 17R/35L.

3.3.3.5 Land-Use Planning at Altus AFB

On-base Land Use Planning

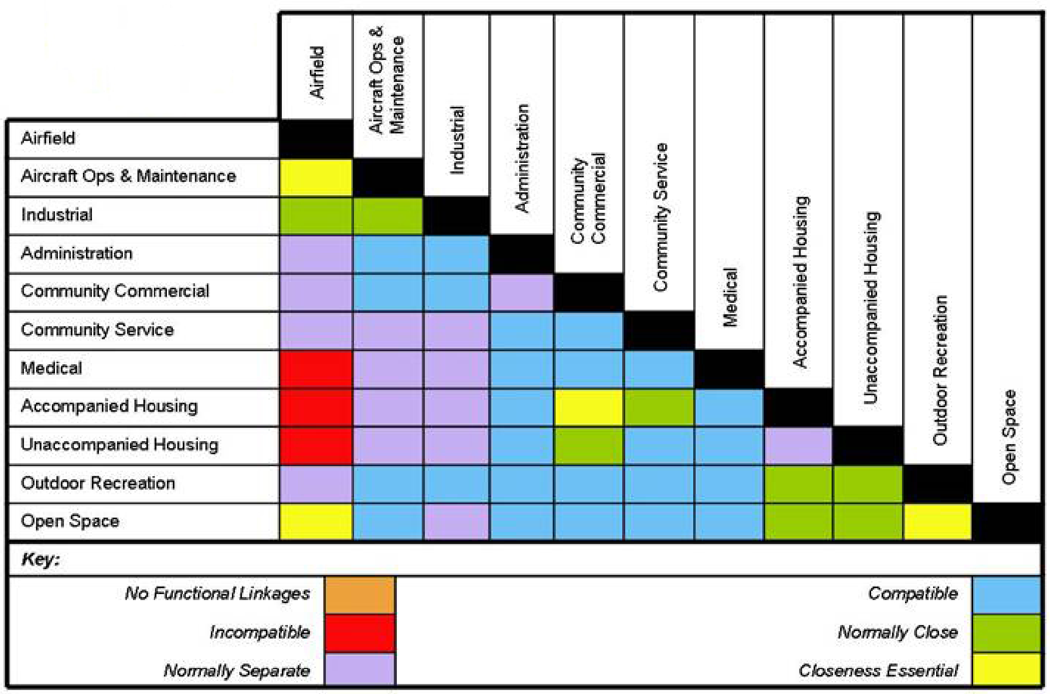
Altus AFB recently updated its General Plan, including its land-use and capital improvement recommendations. In doing so, it inventoried existing land uses and noted linkages between land-use classifications and also noted potential conflicting land uses. The majority of acreage on Altus AFB is devoted to airfield land uses, accounting for nearly 50 percent of the installation. Industrial uses, and recreational uses each account for approximately eight to nine percent of the installation acreage (Table 3-5). The relationship of land-use classifications is shown in Figure 3-6 and land-use patterns at Altus AFB are shown in Figure 3-7.

Table 3-5 Altus AFB 2003 Current Land-use Plan

Land-use Category	Area (Acres)	Percent of Total Land
Administrative	23.73	0.6
Airfield	1874.27	46.1
Aircraft Operations and Maintenance	105.01	2.6
Community Commercial	44.80	1.1
Community Service	27.13	0.7
Housing Accompanied	295.28	7.3
Housing Unaccompanied	38.37	0.9
Industrial	157.78	3.9
Medical	11.98	0.3
Open Space	296.61	7.3
Not Classified	811.23	19.8
Outdoor Recreation	327.07	8.0
Training	55.27	1.4
Total	**4068.53**	100

Source: USAF 2003
Notes:
-Airfield Pavement land use, as shown on the *General Plan* map, was included in Airfield land use.

Figure 3-6 Land-use Relationships



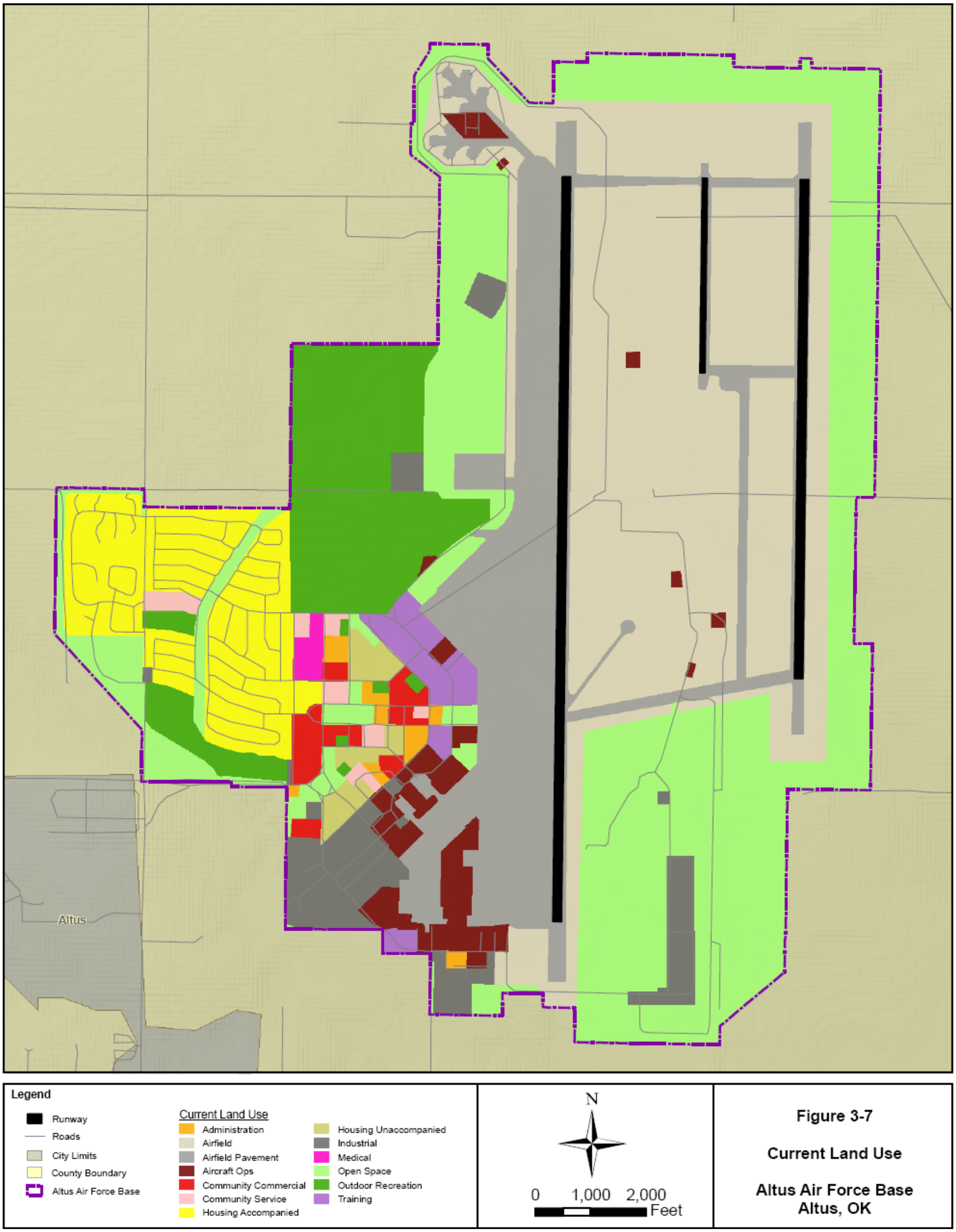


Figure 3-7

Current Land Use

Altus Air Force Base
Altus, OK

Off-Base Land Use Planning

The base and the City of Altus enjoy a unique relationship of cooperation with a high degree of community involvement in sustaining the base's mission into the future. A JLUS was undertaken in 1999. Subsequently, the state of Oklahoma amended the enabling legislation that governs how localities implement land use regulations, requiring those localities surrounding military installations to adopt zoning and subdivision regulations that would protect military facilities from encroachment. The City of Altus most recently adopted its Comprehensive Plan in 2005. The City's Unified Development Code, containing regulations governing zoning, subdivision, and other land use control methods, is a primary means of implementing that plan.

Toward the end of implementing recommendations contained in the JLUS and protecting Altus AFB from encroachment, the City's Planning Commission and Jackson County Zoning Board have joined together to form the Metropolitan Area Planning Council, regulating land use, structure heights, and development density. Their jurisdiction extends to three miles beyond the city limits. The Unified Development Code contains provisions to assess development proposals in the vicinity of Altus AFB for compatibility with respect to aircraft noise, accident potential, and preventing the creation of obstructions to air navigation by constructing tall structures. A Natural Infrastructure Assessment conducted in 2008 indicates that these efforts have been successful, finding no instances of incompatible off-base land uses with respect to noise or accident potential (USAF 2008c).

3.3.4 Air Quality

3.3.4.1 Regional Meteorology

Altus AFB is located 15 miles from the Texas border in the Central Great Plains of Oklahoma, approximately 60 miles west of Lawton, Oklahoma. This area experiences distinct seasons with pleasant springs and autumns, long hot summers, and winters that are milder than those of more northern Plains states. Most of the rainfall occurs in the spring and fall. Winters tend to be very dry. This region is located in what is known as "Tornado Alley". During the period 1950-2003, Jackson County recorded 65 tornadoes. The entire state of Oklahoma averages 54 tornadoes per year.

The average annual mean temperature for Altus AFB is 62 degrees Fahrenheit (°F). The average mean temperature during the summer months is 82.1°F, with record extremes of 44°F and 120°F. The average mean temperature during the winter months is 39.8°F, with record extremes of -4°F and 93°F. Altus AFB averages 106 days per year with temperatures above 90°F. Subfreezing temperatures occur an average of 81 days per year.

The average annual relative humidity is 63 percent. Mean precipitation is 29.1 inches per year, with May and June being the wettest months, and January and February as the driest. The average precipitation during summer months is 9.2 inches. The average precipitation during winter months is 3.4 inches.

The predominant wind direction is from the south-southeast. The average wind velocity is eight miles per hour (mph), with a maximum-recorded 5-second wind speed of 94 mph. Thunderstorms occur an average of 46 days per year predominately in the spring and summer. Altus AFB experiences on average 153 clear days and 65 cloudy days per year, with the remaining 147 days of the year being partly cloudy. Fog occurs an average of 69 days per year. The climatic data presented in this section was obtained from the National Climatic Data Center (NCDC 2008).

3.3.4.2 Air Quality Standards and Regulations

The USEPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) under the CAA. The CAA also set emission limits for certain air pollutants from specific sources, set new source performance standards based on best demonstrated technologies, and established national emission standards for hazardous air pollutants.

The CAA specifies two sets of standards – primary and secondary – for each regulated air pollutant. Primary standards define levels of air quality necessary to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary standards define levels of air quality necessary to protect against decreased visibility and damage to animals, crops, vegetation, and buildings. Federal air quality standards are currently established for six pollutants (known as criteria pollutants), including carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur oxides (SO_x, commonly measured as sulfur dioxide [SO_2]), lead, particulate matter equal to or less than ten micrometers in aerodynamic diameter (PM_{10}) and particulate matter equal to or less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$). Although O_3 is considered a criteria pollutant and is measurable in the atmosphere, it is often not considered as a pollutant when reporting emissions from specific sources, because O_3 is not typically emitted directly from most emissions sources. Ozone is formed in the atmosphere from its precursors – nitrogen oxides (NO_x) and volatile organic compounds (VOCs) – that are directly emitted from various sources. Thus, emissions of NO_x and VOCs are commonly reported instead of O_3.

The NAAQS for the six criteria pollutants are shown in Table 3-6. Units of measure for the standards shown in this table are micrograms per cubic meter of air ($\mu g/m^3$), except for O_3, which is in parts per million (ppm).

Table 3-6 National Ambient Air Quality Standards

Pollutant	Standard Value ($\mu g/m^3$)[(a)]	Standard Type
CO		
1-hr average	40,000	Primary
8-hr average	10,000	Primary
NO_2		
Annual average	100	Primary and secondary
O_3		
8-hr average[(b)]	0.075	Primary and secondary
Lead		
Rolling three month Average	0.15	Primary
Quarterly average	1.5	
PM_{10}		
24-hr average[(c)]	150	Primary and secondary
$PM_{2.5}$		
24-hr average[(d)]	35	Primary
Annual average[(e)]	15	Primary
SO_2		
3-hr average	1,300	Secondary
24-hr average	365	Primary
Annual average	80	Primary

Notes:
CO=carbon monoxide
$\mu g/m^3$=micrograms per cubic meter
NO_2=nitrogen dioxide
O_3=ozone
SO_2=sulfur dioxide
$PM_{2.5}$=particulate matter equal or less than 2.5 micrometers in diameter
PM_{10}= particulate matter equal or less than 10 micrometers in diameter

(a) Units for O_3 are ppm.
(b) To attain the 8-hour O_3 standard, the 3-year average of the fourth-highest daily maximum 8-hour average O_3 concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
(c) The 24-hour standard for PM_{10} is not be exceeded more than once per year on average over three years.
(d) The $PM_{2.5}$ 24-hour standard is based on the 3-year average 98th percentile of 24-hour concentrations at each population-oriented monitor.
(e) The $PM_{2.5}$ annual standard is based on 3-year average of weighted annual mean concentration from single or multiple community monitors.

The USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether the region meets federal primary and secondary air quality standards. An AQCR or portion of an AQCR may be classified as attainment, non-attainment, or unclassified with regard to the air quality standards for each of the criteria pollutants. “Attainment” describes a condition in which standards for one or more of the six pollutants are being met in an area. The area is considered an attainment area for only those criteria pollutants for which the NAAQS are being met. “Nonattainment” describes a condition in which standards for one or more of the six pollutants are not being met in an area. “Unclassified” indicates that air quality in the area cannot be classified and the area is treated as attainment. An area may have all three classifications for different criteria pollutants.

The CAA requires federal actions to conform to any applicable state implementation plan (SIP). USEPA has promulgated regulations implementing this requirement (USEPA 2003a and USEPA 2003b). A SIP must be developed to achieve the NAAQS in non-attainment areas (i.e., areas not currently attaining the NAAQS for any pollutant) or to maintain attainment of the NAAQS in maintenance areas (i.e., areas that were non-attainment areas but are currently attaining that NAAQS). General conformity refers to federal actions other than those conducted according to specified transportation plans (which are subject to the Transportation Conformity Rule). Therefore, the General Conformity rule applies only to non-transportation actions in non-attainment or maintenance areas. Such actions must perform a determination of conformity with the SIP if the emissions resulting from the action exceed applicability thresholds specified for each pollutant and classification of nonattainment. Both direct emissions from the action itself and indirect emissions that may occur at a different time or place but are an anticipated consequence of the action must be considered. The Transportation Conformity Rule does not apply to this project.

The applicability thresholds are 100 tons per year (tpy) for criteria pollutants, except for those given in Table 3-7.

A number of actions are exempted from the requirements of general conformity including:

- Actions that do not have emissions increases.
- Actions with an emissions increase that is clearly *de minimis* (21 actions are listed; primarily actions that are administrative, legal, or routine in nature including routine movement of mobile assets, material and personnel as well as routine maintenance and repair).
- Actions that are not reasonably foreseeable or that respond to natural disasters or emergencies.
- Actions that have been approved under specified Federal programs.

Table 3-7 General Conformity Applicability Thresholds

NAAQS Pollutant	Type of Nonattainment or Maintenance Area	Applicability Threshold (tpy)
Ozone	Extreme NAAs	10 tpy VOC or NO_x
	Severe NAAs	25 tpy VOC or NO_x
	Serious NAAs	50 tpy VOC or NO_x
	Marginal or moderate NAAs inside an ozone transport region	50 tpy VOC (100 tpy NO_x)
	Maintenance areas inside an ozone transport region	50 tpy VOC (100 tpy NO_x)
CO	All NAAs	100 tpy
SO_2	All	100 tpy
PM_{10}	Serious NAAs	70 tpy PM_{10}
	Moderate NAAs	100 tpy PM_{10}
	All Maintenance areas	100 tpy
$PM_{2.5}$	All	100 tpy
Lead	All NAAs	25 tpy Pb
	All Maintenance areas	25 tpy Pb

Notes:
CO = carbon monoxide
NO_x = nitrogen oxides
O_3 = ozone
Pb = lead
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than ten micrometers in diameter
SO_2 = sulfur dioxide
tpy = tons per year

If an action triggers the applicability thresholds and is not exempt from the requirements, the Federal agency must demonstrate and document that the direct and indirect emissions would conform to the SIP. In particular, it must be demonstrated that the proposed action would not:

- Cause or contribute to a new violation of an NAAQS,
- Interfere with the SIP,
- Increase the frequency or severity of existing violations, or
- Delay attainment or any required progress toward that attainment.

The determination generally involves emission estimation and air quality modeling for the entire nonattainment or maintenance area (usually a multi-county area). If the initial conformity determination demonstrates that the proposed action does not conform to the SIP, measures must be established and committed to mitigate the projected air quality impacts. A timeline for implementation of these measures may be specified; however, enforcement measures must also be established to ensure that they are implemented as required.

3.3.4.3 Regional Air Quality

Altus AFB is located within the Southwestern Oklahoma Intrastate AQCR (AQCR 189), which consists of the following counties: Beckham, Caddo, Comanche, Cotton, Greer, Harmon, Jackson, Jefferson, Kiowa, Stephens, Tillman, and Washita County. The entire AQCR 189 is designated as in attainment for all NAAQS. Therefore, Altus AFB is not subject to the General Conformity regulations (40 CFR Parts 6, 51 and 93).

Potential emissions from the proposed action would occur primarily from demolition and construction activities at Altus AFB and would include activities such as grading, filling, paving, and equipment operation. Thus, emissions would be localized within the area surrounding the

project location. For this reason, the analysis in this EA will address potential impacts within Jackson County, instead of the entire AQCR that covers a large geographical area.

Oklahoma is located in the region designated as the Central Regional Air Planning Association (CENRAP). CENRAP is a collaborative effort of state governments, tribal governments, and various federal agencies established to initiate and coordinate activities associated with the management of regional haze, visibility and other air quality issues in the central United States. CENRAP promotes the exchange of information between these states and other interested parties related to the control of air pollution.

On 6 July 2005, the USEPA finalized the "Regional Haze Regulations and Guidelines for Best Available Retrofit Technology Determinations". This rule provides guidance to the states that are required to develop regulations for reducing the impacts of regional haze on Class 1 areas. Under the CAA, a Class I area is one in which visibility is protected more stringently than under the NAAQS, and includes national parks, wilderness areas, monuments, and other areas of special national and cultural significance. The nearest Class I area is Wichita Mountains National Wildlife Refuge, located approximately 29 miles from Altus AFB. There are no other Class I areas located within 120 miles of Altus AFB.

The guidance specifically addresses sources that were constructed between 1962 and 1977, contain an emission unit belonging to one of the 26 source categories, and emit more than 250 tpy. This rule does not apply to Altus AFB because they do not emit more than 250 tpy of a regulated pollutant.

3.3.4.4 Altus AFB Air Quality

An accurate emissions inventory is needed for assessing the potential contribution of a source or group of sources to regional air quality. An emissions inventory is an estimate of the actual and potential pollutant emissions generated by a source or sources over a period of time, normally a calendar year. The Jackson County emissions include emissions from point, area, non-road mobile, and on-road mobile sources. Stationary emission sources at Altus AFB include boilers, generators, surface coating, paint booths, storage tanks, fueling operations, and woodworking operations, among others. Mobile emission sources include: aircraft flight operations, on-wing engine testing, aerospace ground equipment (AGE), government owned on-road vehicles, and non-road vehicles. Table 3-8 compares the 2007 actual emissions for Altus AFB and the 2002 Jackson County emissions. As shown in Table 3-8, Altus AFB contributes a small amount to the Jackson County emission totals.

Table 3-8 Jackson County Emissions and Altus AFB Actual Emissions

	Annual Emissions (tpy)					
	CO	**VOC**	**NOx**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2002 Jackson County Emission Inventory[a]	12,100	1,530	1,398	111	7,720	1,617
2007 Altus AFB Actual Emissions[b]	5.6	3.8	8.1	0.10	0.77	0.49
Percent of Regional Emissions[c]	0.046	0.25	0.58	0.090	0.010	0.030

Notes:
AFB = air force base
CO = carbon monoxide
MSA = metropolitan statistical area
NO_x = nitrogen oxides
O_3 = ozone
SO_2 = sulfur dioxide
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than ten micrometers in diameter
tpy = tons per year
(a) Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources. Jackson County. Source: USEPA 2002, AIRData; Emissions come from an extract of USEPA's National Emissions Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html.
(b) 2007 Air Emissions Inventory Turn-around Document. Actual emissions are the air pollutant emissions that result from the actual operation and material usage quantities during a one-year period (i.e., typically a calendar year).
(c) Compares 2007 Altus AFB actual emissions to 2002 Jackson County emissions.

3.3.5 Earth Resources

3.3.5.1 Definition of the Resource

An area’s geological resources typically consist of surface and subsurface materials and their inherent properties. Principal factors influencing the ability of geological resources to support structural development are seismic properties (i.e., potential for subsurface shifting, faulting, or crustal disturbance), topography, and soil stability.

Seismic properties indicate the potential for earthquake activity in an area. Those regions of the country that have subsurface shifting, faulting, or crustal disturbance are more likely to be affected by earthquake activity.

Topography is defined as the relative positions and elevations of the natural or human-made features of an area that describe the configuration of its surface. An area’s topography is influenced by many factors, including human activity, seismic activity of the underlying geological material, climatic conditions, and erosion. Information about an area’s topography typically encompasses surface elevations, slope, and physiographic features (i.e., mountains, ravines, or depressions).

The term “soil” generally refers to unconsolidated materials lying over bedrock or other parent material. Soils play a critical role in both the natural and human environment. Soil depth,

structure, elasticity, strength, shrink-swell potential, and erodibility determine a soil's ability to support man-made structures and facilities. Soils are typically described in terms of their series or association, slope, physical characteristics, and relative compatibility or constraints with respect to particular construction activities and types of land use.

3.3.5.2 Geology

Altus AFB is located within the Hollis Basin which was once a large seabed of shallow marine, deltaic, and alluvial deposits. The underlying sediment deposits included sandstone, shale, and siltstone, interlaced with beds of gypsum and salt. Altus AFB lies within the Central Redbed Plains area of the Central Lowlands physiographic region, so named so because of the high iron content of its deposits (USAF 2003).

3.3.5.3 Topography

The topography at Altus AFB is gently sloping from north to south, but is generally level. The elevation differs at different points of the installation. The northern edge of the base contains the highest point at 1,390 feet and the southern edge contains the lowest point at 1,330 feet. The Wichita Mountains are located to the northeast of the installation. The immediate landscape lacks any distinct features with the only relief created by stream erosion (USAF 2003).

3.3.5.4 Soils

There are two distinct areas on the installation with different soil types. The first area is the main part of the installation and the family housing area. This area predominately contains soils from the Tillman-Hollister association. This association is characterized by broad, nearly level, upland areas occasionally interrupted with narrow creek channels or drainage ways. The soil texture ranges from clay loam to clay. These soils have a slow permeability rate that can cause slow water infiltration and moderately high surface runoff potential. The second area consists of the region containing the outside runway and assault strip. This region predominately contains soils of the Miles-Nobscot association. This association is characterized by mostly level uplands to moderately sloping creek channels. The soil texture ranges from sandy loam to clay loam to clay. These soils have the potential to have a moderate to moderately rapid percolation rate that can lead to a moderate infiltration rate, considerably slowing the surface runoff rate (USAF 2003).

3.3.6 <u>Biological Resources</u>

Biological resources include living, native, or naturalized plant and animal species and the habitat in which they occur. The natural resources at Altus AFB are managed under an Integrated Natural Resources Management Plan (INRMP) (USAF 2007c). For the purposes of this analysis, biological resources are divided into the categories of vegetative communities; wildlife including mammals and bird species; and threatened, endangered, or state listed species of concern.

The United States Fish and Wildlife Service (USFWS) is responsible for the recovery of federally listed threatened and endangered species under the ESA of 1973. The Oklahoma

Department of Wildlife Conservation (ODWC) provides management for wildlife at the state level.

3.3.6.1 Vegetation

Historically the land on which Altus AFB sits was a region of mixed grass prairie with few trees. The current vegetation in areas with native vegetation is similar to the historical species composition. In regions with fine sandy loam soils (Altus or Miles series) the vegetative community is dominated by big bluestem (*Andropogon gerardii*) and little bluestem (*Andropogon scoparius*) (USAF 2007c). In sections with soils of the Tillman clay loam and Hollister series, vegetative communities are dominated by blue grama (*Bouteloua gracilis*) and sideoats grama (*Bouteloua curtipendula*) (USAF 2007c). Approximately 104 acres of Altus AFB are unimproved grounds with native vegetation (USAF 2007c).

Areas of improved or semi-improved land include turf and landscaped areas dominated by common bermudagrass (*Cynodon dactylon*) and semi-improved grounds dominated by sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), switchgrass (Blackwell variety) (*Panicum virgatum*), buffalograss (south one-half of base) (*Buchloe dactyloides*), and little bluestem (*Andropogon scoparius*).

3.3.6.2 Wildlife

Two large mammal species, the white-tailed deer and the coyote, have been recorded on Altus AFB. Eight small mammal species are known on Altus AFB: eastern cotton tail rabbit, black-tailed jack rabbit, thirteen lined ground squirrel, hispid cotton rat, white-footed mouse, house mouse, deer mouse and fulvous harvest mouse (USAF 2007c).

A total of 68 bird species have been recorded on Altus AFB. The most common species was the great-tailed grackle followed by mourning doves. Other species observed frequently include cliff swallows, house sparrows, and western meadowlarks (USAF 2007c).

3.3.6.3 Rare, Threatened, and Endangered Species

There are no known federal- or state-listed endangered species, either plants or animals, on Altus AFB, and there are no known species of high concern. There are no listed threatened or endangered plant species that occur in southwestern Oklahoma. Also, there is no critical habitat known to occur on base (Schnell et al 1998; USAF 2007c).

3.3.6.4 Wetlands

EO 11990, Protection of Wetlands, 24 May 1977, directs federal agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are directed to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. The CWA sets the basic regulatory framework for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA establishes a federal program to regulate the discharge of dredged and fill material into waters of the U.S., including

wetlands. Four federal agencies are responsible for identifying and regulating wetlands: the United States Army Corps of Engineers (USACE), USEPA, USFWS, and Natural Resources Conservation Service (NRCS). The USACE and USEPA are primarily responsible for making jurisdictional determinations and regulating wetlands under Section 404 of the CWA. The USACE also makes jurisdictional determinations under Section 10 of the Rivers and Harbors Act of 1899. The NRCS has developed procedures for identifying wetlands for compliance with the Flood Security Act of 1985 and the USFWS has developed a classification system for identifying wetlands.

Surface water from Altus AFB drains into two streams, Stinking Creek and an unnamed tributary of Stinking Creek, flowing from the northwest to the southeast (USAF 2007b). An agricultural irrigation canal, the Ozark Canal, enters base property at the northern end and crosses under the northern edge of the main runway, continues to run the length of the eastern boundary, and exits the base at the southern edge. This canal receives no surface runoff from the base, and the base has no access to its waters (USAF 2007b).

The wetlands created by these surface water features comprises less than one acre of the installation. This area can be dry or completely under water, depending on the amount of rainfall (USAF 2007b). Efforts have been made across the installation to control storm water run-off by collecting it into a system of open ditches and carried to one of five discharge points from the base (USAF 2007b). A storm water pollution prevention plan, with measures such as absorbent pads, and oil-water separators, has been implemented that allows any pollutants entering the system to be recovered (USAF 2007b).

3.3.7 Cultural Resources

3.3.7.1 Regulations and Criteria

Cultural resources are prehistoric and historic sites, districts, structures, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. A historic district is an area that "possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (NPS 1997).

Numerous laws and regulations require that possible effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the actions, and prescribe the relationships among involved agencies. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the NHPA (especially Sections 106 and 110), the ARPA, the AIRFA, and the Native American Graves Protection and Repatriation Act (NAGPRA). Under AIRFA, Altus AFB has no known traditional cultural properties or sacred sites to which the base must provide access.

Section 106 of NHPA requires that federal agencies give the Advisory Council on Historic Preservation a "reasonable opportunity to comment" on proposed actions. Federal agencies must consider whether their activities could affect historic properties that are already listed, determined eligible, or not yet evaluated under the National Register of Historic Places (NRHP)

criteria. Properties that are either listed on or eligible for listing in the NRHP are provided the same measure of protection under Section 106.

The following criteria have been established as guidance for evaluating potential entries to the NRHP. “Significance” in American history, architecture, archeology, and culture is granted to districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that meet at least one of the following criteria:

- an association with events that have made a significant contribution to the broad patterns of history (Criterion A);
- an association with the lives of persons significant in history (Criterion B);
- embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguished entity whose components may lack individual distinction (Criterion C); or
- have yielded, or may likely yield, information important in prehistory or history (Criterion D).

Resources less than 50 years of age must be evaluated under Criterion Consideration G: Properties That Have Achieved Significance in the Last Fifty Years. This criterion requires that such resources be “exceptionally important” to qualify for listing. Resources less than 50 years of age must also meet the criteria for resources 50 years or older (i.e., A, B, C, or D) and retain their integrity.

3.3.7.2 Archaeological Resources

3.3.7.2.1 Previous Investigations

The National Park Service conducted an archeological baseline survey of Altus Air Force Base in 1995. The assessment included a review of previous archeological investigations and an archeological reconnaissance survey of a proposed 43.10-hectare (106.5-acre) area for military family housing (MFH) expansion. The three previous archeological surveys conducted on the base identified historic homesteads/farmsteads; however, all were recommended ineligible for the NRHP. The National Park Service survey of the proposed housing expansion did not identify any archaeological properties; therefore, it was recommended that no further archaeological investigations would be required. According to De Vore (1995), these surveys have completed all archeological inventory requirements for Altus AFB.

3.3.7.2.2 Archaeological Properties

There are no NRHP-eligible archeological properties associated with Altus AFB.

3.3.7.3 Historic Resources

3.3.7.3.1 Previous Investigations

One investigation for historic resources has been conducted at Altus AFB (Salo and Prior 2003). This investigation inventoried 1,056 Cold War-era resources, of which 17 were further evaluated for eligibility under Criterion Consideration G for properties under 50 years of age. The remaining 1,039 resources, also under 50 years of age at the time of evaluation, were housing, base support facilities, hangars, and training facilities that had no direct or significant association with the Cold War mission, and thus did not meet the requirements of Criterion Consideration G (USAF 1993).

Of the 17 resources evaluated under Criterion Consideration G, two were recommended eligible for listing on the NRHP—Building 285 and the Alert Apron. Building 285 is a maintenance hangar of exceptional importance, eligible for its association with the 1950s Strategic Air Command (SAC) crew alert mission under Criterion A and under Criterion C as a medium size, second generation, steel double-cantilever SAC maintenance hangar designed by Kuljian Corporation. The Alert Apron was also determined to be of exceptional importance and determined eligible under Criterion A for its association with the 1950s SAC crew alert mission and under Criterion C as an example of the double alter apron design.

3.3.7.3.2 Historic Properties

Of the 11 buildings or structures scheduled for demolition or alteration, eight buildings (82 [Visiting Officer's Quarters], 130 [Special Operations], 267 [Fire Station], 307 [Open Mess], 415 [RAPCON Center], 426 [Traffic Check House], 444 [Squadron Operations], and 2000 [Traffic Check House]) are under 50 years of age and do not meet the requirement for exceptional importance under Criterion Consideration G. Three buildings (156 [Gymnasium], 323 [Shop, Avionics], and 330 [Shop General Purpose]) were also found to lack exceptional significance when evaluated, but have now turned 50 years of age. Given the function and mission of these buildings, however, it is unlikely that they hold historical or architectural significance under standard NRHP criteria; therefore, the circumstances support a determination that these buildings are ineligible for listing on the NRHP. SHPO concurrence would be required prior to demolition of any facilities.

3.3.8 <u>Water Resources</u>

3.3.8.1 Surface Water

Altus AFB is located within the Red River Basin which flows into the Atchafalaya River and then into the Gulf of Mexico. The Red River Basin covers 94,500 square miles, a five-state area (USGS 1998). Altus AFB discharges into the North Fork of the Red River by way of an unnamed tributary of Stinking Creek. The North Fork of the Red River discharges into the Red River, approximately 12 miles to the southeast of Altus AFB (USGS 1985)

Altus AFB discharges storm water, off-base, from five outfalls, one located on the eastern portion of the Base and four located on the southern portion. The outfalls receive storm water through a collection system of open drainage channels and small retention ponds. The northern

and eastern portion of the base discharge water into Stinking Creek by the one outfall located on the eastern portion of the base. Stinking Creek flows from the northwest to the southeast. The remaining outfalls receive storm water from the housing and southern portion of the Base and discharge to the unnamed tributary of Stinking Creek. This water body flows from northwest to southeast and discharges into Stinking Creek five miles to the southeast of the base (USAF 2006a). An open drainage channel, Ozark Channel, is located within Altus AFB; however it is not associated with the storm water collection system The channel enters Altus AFB at the northern portion of the base, flows under the inside runway, runs the length of the eastern base boundary, and exits the base to the south. The channel is utilized for agricultural purposes; Altus AFB cannot access the waterway (USAF 2003).

Permitting for storm water discharges has been delegated to the State of Oklahoma by the National Pollutant Discharge Elimination System (NPDES). Individual and general storm water permits require the permittee to develop and implement a pollution prevention plan to monitor discharges for specific pollutants. Altus AFB is an industrial facility and as such has obtained an OKR05 Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activities from the Oklahoma Department of Environmental Quality (ODEQ). This permit allows for Altus AFB to discharge storm water associated with industrial activities into receiving waters within the State of Oklahoma. The permit requires monitoring of specific pollutants at outfalls, utilization of BMPs, and implementation of engineering controls to control runoff. The Storm Water Industrial General Permit Authorization number is OKGP01480 (USAF 2006a).

3.3.8.2 Groundwater

Altus AFB is located within the Southwestern Oklahoma Groundwater Basin. This basin is approximately 1,593 square miles and is primarily comprised of interbedded shale and sandstone. The water obtained from this groundwater basin is primarily utilized by agricultural operations, and exceeds USEPA’s secondary drinking water standards for sulfate, chlorides, and dissolved solids. In 1996, 43 acre feet of groundwater was withdrawn from the basin. The basin is recharged by precipitation at a rate of approximately 2.25 inches per year (OWRB 1998). Altus AFB is not specifically located over a defined aquifer, only a water bearing unit. Within the water bearing unit, the depth to groundwater varies from less than two feet below ground surface, near Stinking Creek, to over 12 feet (USAF 2006a).

3.3.8.3 Floodplains

EO 11988, *Floodplain Management*, requires that federal agencies provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands.

Two 100-year floodplains were mapped within Altus AFB in 1980 (FEMA 1980). The two floodplains are located on the eastern and western portions of the base. The eastern floodplain is associated with the open storm water drainage channel that receives storm water from the north and eastern portions of the base, and discharges to Stinking Creek. This floodplain is located in the runway area. The second floodplain is located within the MFH area and is associated with the unnamed tributary of Stinking Creek. After 1980, drainage improvements around water

bodies have occurred along with additional development on Altus AFB (USAF 2003). The current mapping of flood plains may be inaccurate and not represent the current state at Altus AFB.

3.3.9 Hazardous Materials and Wastes

3.3.9.1 Hazardous Materials

Hazardous material use and management at Altus AFB are regulated under TSCA, Occupational Safety and Health Administration (OSHA), Emergency Planning and Community Right-to-Know Act, and Air Force Occupational Safety and Health Standards. The regulations require personnel using hazardous materials to be trained in the application, management, handling, and storage of material; know the location of material safety data sheets (MSDSs) for all hazardous materials that they are using; and wear the correct personal protective equipment required for materials that are being used. Altus AFB has a Hazardous Waste/Recovery Waste Management Plan in place that documents management, measurement, and reporting goals in relation to hazardous materials located on Altus AFB and all associated property. A list of hazardous chemicals, including MSDSs, used on-base is located in Hazardous Materials Pharmacy, Building 228 (USAF 2003).

Current operations at Altus AFB and associated property require the use of hazardous materials in varying quantities. Hazardous materials are used by military personnel and on-base contractors. The location of hazardous materials, procedures and equipment at Altus AFB used to prevent and clean up a release, and actions to be taken in the event of a release are documented in the *Altus AFB Spill Prevention and Response Plan* (USAF 2003).

3.3.9.1.1 Asbestos

Asbestos surveys have been conducted within Altus AFB, in areas that are suspected to have asbestos-containing materials (ACM). These suspected areas are buildings constructed prior to the 1960s. Altus AFB maintains the results of these surveys (USAF 2003). ACM is potentially present in every facility that houses pipe insulation, cement pipe, floor tile, floor tile adhesive, roof patching sealant, wall board in mechanical closets, wall and ceiling texture, and wall board panels. The *Altus AFB Asbestos Management Plan* and the *Altus AFB Asbestos Operations Plan* are in effect and qualified contractors are hired to perform abatement and removal when applicable. The plans detail procedures for notification, record keeping, protection, and abatement associated with ACM; they also ensure that Altus AFB is in compliance with all ACM related federal, state, and local regulations (USAF 2003).

3.3.9.1.2 Lead-Based Paint

A lead-based paint (LBP) survey was conducted within selected MFH units and high priority facilities in 1995. LBP was observed within MFH units. The results of the survey and additional surveys are located within 97 Civil Engineer Squadron/Environmental Management (CES/CEV). When a facility is slated to be either renovated or demolished, such that painted surfaces are disturbed, 97 CES/CEV will review the project prior to commencing any site activities. Altus AFB has a LBP management plan that establishes responsibilities, procedures for assessing risk,

hazard management and risk reduction, medical screening, record keeping, waste disposal requirements, and provides guidance for the capture or removal of LBP scrapings or dust. Historic painting activities did not include capture and proper disposal of paint scrapings or dust; therefore, it is possible that the soil in areas where LBP was used may exhibit elevated concentrations of lead. Currently, families residing in MFH are notified of the possible presence of LBP prior to taking occupancy (USAF 2005a).

3.3.9.1.3 Pesticides

Pesticide application is routinely performed and managed by the Pest Management Shop. The central bulk storage facility for pesticides is located at Building 387T (Pest Management Shop). A copy of MSDSs and pesticide labels are located at the Pest Management Shop and with the Hazardous Materials Program Manager. Records of the pesticide management are maintained in the Integrated Pest Management Information System which includes self-help items, golf course, contractor, and in-house applications. Commercially available pesticides and herbicides are applied as needed along roadways, fire breaks, and pre-determined locations (spot applications) throughout the installation. Facility custodians and housing occupants can utilize the CES Self-Help program to obtain specific pest control materials and guidance on using those materials. Application and use of these and all pesticides and herbicides is done in accordance with the Pest Management Plan (USAF 2005b).

Historic pesticide applications, including diazinon, allethrin, chlordane, and pyrethrin-based products, have occurred throughout Altus AFB. These products were used within the appropriate guidelines for application at the time they were used. Historically, chlordane was injected beneath foundations of buildings when termite infestations were observed. Due to the persistence of chlordane in the environment, it is likely that concentrations of chlordane may be present in soils (USAF 2004).

Prior to the development of Altus AFB, the land on which the installation is located was utilized for agricultural purposes. The primary crops cultivated were cotton and wheat, allowing for the potential that pesticides, herbicides, and insecticides were applied on the property (USAF 2004).

3.3.9.2 Hazardous Waste

Hazardous wastes are defined by the Solid Waste Disposal Act as amended by the RCRA, which was further amended by the Hazardous and Solid Waste Amendments, RCRA subtitle C (40 CFR, Parts 260 through 270). Hazardous wastes are defined as wastes with properties that are dangerous or potentially harmful to human health or the environment. Hazardous wastes are regulated by the USEPA. The USEPA has delegated its hazardous waste regulatory authority in Oklahoma to the State of Oklahoma. Additionally, Altus AFB hazardous waste management is regulated under AFI 32-7013, *Hazardous Waste Management and Minimization*.

Hazardous waste regulations are implemented at Altus AFB through hazardous waste permitting procedures and the *Altus AFB Hazardous Waste/Recovery Waste Management Plan*. The plan details hazardous waste packaging, turn-in, transportation, storage, record keeping, and emergency procedures. Hazardous waste is generated at Altus AFB from vehicle, building, and equipment maintenance; spent hazardous materials; and spills. Air Force waste management

operations at Altus AFB are registered with the USEPA under identification number OK9571824045, as a large quantity generator (USEPA 2009).

Day-to-day operations at Altus AFB generate multiple types of hazardous wastes that require special handling and proper disposal. These include oils and fuels, cleaning compounds, paints, solvents, lead foil, mercury, and batteries. Hazardous wastes are collected at 26 initial accumulation points (IAP). When the IAPs reach capacity, CEV is contacted and the hazardous waste is relocated to the 90-day accumulation site, located at Building 283 (USAF 2003). Prior to, or on the 90th day, the accumulated hazardous waste is transported off base and disposed of by a regulated and licensed transporter and disposal contractor. Altus AFB generated 20.64 tons of hazardous waste throughout 2006 (USAF 2007d).

3.3.9.3 Environmental Restoration Program

The ERP was implemented by the DoD to identify and evaluate areas and constituents of concern from toxic and hazardous material disposal and spill sites. Once the areas and constituents had been identified, the ERP was tasked to remove the hazards in an environmentally responsible manner. All response actions are based upon provisions of CERCLA, and the *Superfund Amendments and Reauthorization Act of 1986* as clarified in 1991 by EO 12580, *Superfund Implementation*.

Altus AFB has a total of twenty four ERP sites. Currently, two of the ERP sites are closed or no-longer considered to be an ERP site. Only eight active ERP sites are located within one-half mile of all the proposed construction, demolition, and renovation activities. Table 3-9 provides additional information about the ERP sites (USAF 2006b). The information provided on the eight active ERP sites has been summarized from the *ERP Management Action Plan*.

The two active ERP sites SS017 and SS018 are currently undergoing remedial actions. ERP site SS017, Spill Site 17, involves contaminated groundwater. The groundwater has entered into a tributary of Stinking Creek and remediation of the groundwater has included pump and treat and a bark mulch barrier in conjunction with in-situ bioremediation. Remediation began in 1999 and is on-going. ERP site SS018 was historically utilized as a storage area and consists of groundwater contamination. The groundwater is currently undergoing in-situ remediation and has been undergoing remediation since 1999. Four sites are undergoing long term monitoring, these sites are SS010, ST012, SS023, and SS024. All of the monitoring includes determining the levels and movement of contamination. The remaining two sites, FT006 and SS022, are awaiting a record of decision to be drafted. The record of decision will document the course of action for the sites (USAF 2006b).

Table 3-9 Altus AFB Environmental Restoration Program – ERP Sites Located Within One-Half Mile of Proposed Construction Activities

Site ID	Site Name	Regulatory Phase	Description
FT006	FPTA No. 1	ROD/DD	The site includes contaminated fuels, waste oils, solvents, thinners, water, protein foam, chlorobromomethane, carbon tetrachloride, and dioxins. The site was in use from 1954 to 1956. The contaminated soil was removed in 2005 to 2006.
SS010	Service Station	LTM	The site was a commercial automotive services facility from 1969 to 1999. In 1999 and 2000, the underground storage tanks (USTs), facility, and associated concrete and asphalt were removed, after the construction of a new automotive service facility. During the time of operation, at least two of the USTs leaked gasoline. The groundwater located beneath the facility is currently contaminated with benzene, cadmium, barium, chromium, ethyl benzene, manganese, methyl ethyl ketone, naphthalene, toluene, and xylene.
ST012	Auto Hobby Shop Concrete Holding Tank	LTM	This site is currently in use, as an auto hobby shop. The concrete holding tank stored motor oil from 1959 to 1990, underground. Surface contamination, a drainage area, has been observed. The constituents of the contamination includes manganese, nitrates, tetrachloroethylene (TCE), barium, and vinyl chloride. The contaminated soils and any potential sources were removed from 1994 to 2007. The site is currently under long term monitoring.
SS017	Spill Site 17	RA-C	This site consists of contaminated groundwater, with the source of the contamination from a spill that occurred at Buildings 506 and 424. The contaminated groundwater has been observed in an unnamed tributary of Stinking Creek and off-base. The groundwater is contaminated with TCE and has undergone and is currently undergoing bioremediation. The groundwater is not utilized for drinking water.
SS018	Spill Site 18	RA-C	The site historically was utilized as a storage area. The groundwater located under the site is contaminated with barium, chloroform, carbon tetrachloride, chromium, and copper; and the contamination has moved off-base. The contaminated groundwater has undergone and is currently undergoing bioremediation.
SS022	Group 7	ROD	The site is located at the aircraft industrial area and consists of groundwater contamination. The groundwater is contaminated with 1,2-dichloroethene, barium, benzene, cadmium, carbon tetrachloride, chloroform, chromium, and TCE. The groundwater is not considered to be a potential source for drinking water.
SS023	Spill Site 23	LTM	The site is located adjacent to the large aircraft parking area. The site consists of groundwater contaminated with TCE, vinyl chloride, and chromium. The groundwater has undergone bioremediation from 2005 to 2007.
SS024	Spill Site 24	LTM	The site consists of groundwater contamination, contaminated with TCE. The site is currently undergoing long-term monitoring to delineate the extent of the contamination.

Notes:
RA-C = Remedial Actions – Construction
ROD/DD = Record of Decision/Decision Document
LTM = Long-term Monitoring

3.3.9.4 Military Munitions Response Program

In addition to ERP sites, Altus AFB also has a Military Munitions Response Program (MMRP). The MMRP was established in 2001 to manage the environmental, health, and safety issues that could be created by unexploded ordinance, discarded military munitions, and munitions constituents. There is one MMRP site located within Altus AFB. It is not located within one-half mile of the proposed construction and demolition activities (DoD 2007).

3.3.10 Safety

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The elements of an accident-prone environment include the presence of a hazard and an exposed population at risk of encountering the hazard. Numerous approaches are available to manage the operational environment to improve safety, including reducing the magnitude of a hazard or reducing the probability of encountering the hazard. The primary safety categories discussed in this analysis include Ground and Traffic Safety and Construction and Demolition Safety.

3.3.10.1 Ground and Traffic Safety

This section includes activities associated with ongoing operational, sports and recreation, and other activities that are associated with vehicle usage/traffic safety issues on base. Factors involving primary occupational safety and health issues are addressed in the Occupational Safety and Health Act and Air Force Occupational Safety and Health Standards. All day-to-day operations and maintenance activities on Altus AFB are performed by trained, qualified personnel in accordance with applicable equipment technical directives, approved occupational safety and health standards, and sound maintenance practices. The handling, processing, storage, and disposal of hazardous byproducts resulting from construction, demolition, operations, and maintenance are accomplished in accordance with the federal and state requirements applicable to each substance. Both natural and man-made environmental hazards may be present on base at any time due to the varied activities that take place at Altus AFB. Naturally-occurring potential health and safety hazards include insects, snakes, climactic conditions, and flash floods. Potential man-made health and safety hazards include general injuries due to outdoor physical training activities and both on- and off-base motor vehicle accidents.

According to the FY2008 Altus AFB Mishap Analysis: Injuries, General Trends, and Summaries, there were a total of 184 total mishaps by military and civilian personnel (USAF 2008b). Of the 184 total mishaps, 33 were reportable, or mishaps that resulted in lost workdays, and 151 were non-reportable, or “close calls.” There were no reportable privately-owned vehicle (POV) mishaps in FY2008. The Air Force mandated training programs for motorcycles, beginners and advanced rider courses, and a certified defensive driving course. Of the 151 non-reportable mishaps, 53 occurred to off-duty military personnel. Miscellaneous injuries accounted for 43 percent of non-reportable, off-duty military personnel mishaps; sports and recreation, 40 percent, and POVs, 17 percent. Twenty-seven non-reportable, on-duty military mishaps were reported in FY2008. Nearly half of those mishaps fell under the Ground and Industrial category. Hand injuries (hand, wrist, and fingers) were the most common on-duty mishaps (USAF 2008b).

There were 71 non-reportable civilian mishaps in FY2008. Aircraft Maintenance accounted for 56 percent of all civilian injuries. Civilian injuries comprised approximately 40 percent of Altus' total mishaps (USAF 2008b).

There were 33 reportable mishaps at Altus AFB. Of the 33 reportable mishaps, 17 involved military personnel and 16 involved civilian personnel. Military personnel mishaps included off-duty activities and sports and recreation. Civilian personnel mishaps included slips, trips, falls, cuts, and strained backs (USAF 2008b).

Because the Proposed Action and alternatives would not involve any changes to current weapons/explosives operations at Altus AFB, safety in these areas of operation was not outlined in this section.

3.3.10.2 Construction and Demolition Safety

Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees, and implementation of operational practices that reduce risk of illness, injury, death, and property damage. The health and safety of on-site military and civilian workers are safeguarded by numerous DoD and Air Force regulations designed to comply with OSHA standards. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

3.3.11 Infrastructure and Utilities

Infrastructure and utilities on Altus AFB consist of potable water, sanitary sewer, solid waste, drainage, transportation, and electricity/natural gas. These services are required and utilized on a daily basis by the on-base population. Utilities on Altus AFB are provided by off-base suppliers.

To determine the current and future utilization of these services, historical data is reviewed and compared to an effective population. The effective population determines the number of people who utilize a service per 24-hour day, by factoring in the number of on-base and off-base personnel. Under this metric, Altus AFB personnel who live off-base are weighted by a factor of one-third to represent their average eight-hour per day demand on installation utilities. By calculation, Altus AFB currently has an effective population of 3,167 (Table 3-10). To determine the per capita usage of a utility, the historical data is reviewed (i.e., annual usage of potable water) and then divided by the effective population. The number generated is the annual per capita usage of that utility. When utilizing an effective population to determine utility usage statistics, it must be noted that the historical usage numbers include all domestic, industrial, commercial, and public use. Including these types of usages creates a higher value and does not represent an actual "per person" consumption rate for the installation.

Table 3-10 Altus AFB Effective Population

Category	Population	Effective Population Factor	Effective Population
On-base Personnel (24-hr population)	2,093	1.00	2,093
Off-base Personnel[1] (8-hr population)	3,254	0.33	1,074
Total	**5,347**	**--**	**3,167**

Notes:
[1] Military Dependents and Military Retirees residing off base are not included in the 8-hr population for the installation.
hr – hour

3.3.11.1 Potable Water

Altus AFB's potable water is provided by the City of Altus. The Tom Steed Reservoir is the primary water source for the City of Altus; the Quartz Mountain Reservoir and groundwater act as secondary sources (USAF 2008c). A 16-inch main and a 10-inch main deliver the water to Altus AFB, entering near the front gate. Potable water is stored in two elevated storage tanks with a total capacity of 750,000 gallons. The water distribution system is a looped system and about 85 percent of the system main pipes are polyvinyl chloride pipe (PVC). The remaining mains are Transite lines, pipe constructed of Portland cement and asbestos fibers, and cast iron lines. These types of pipe deteriorate rapidly in the highly corrosive soils of this region (USAF 2003). The 2003 General Plan classifies the Altus AFB water distribution system as "yellow" using the Facility Infrastructure Examination (FIX) system. A yellow designation states that the system is mission capable, but requires major repair or an upgrade within five years of the designation. The distribution system, including distribution lines, mains, and service lines, is considered to be in good condition but will require moderate updating/construction to ensure future use and capability. In addition, the storage tanks are considered to be in fair condition (USAF 2003).

The City of Altus has a contract in place with Altus AFB designating that the maximum water consumption for Altus AFB cannot exceed 375 million gallons per year (1.03 million gallons per day [mgd]) (USAF 2003). In FY2007, Altus AFB consumed approximately 148 million gallons or 0.41 mgd of potable water (USAF 2008c). Using the effective population, as stated in Table 3-10, the daily per capita potable water consumption in FY2007 was 129.5 gallons per day (gpd). This is approximately 40 percent of the contracted water supply.

3.3.11.2 Sanitary Sewer

Most of the sanitary sewer system at Altus AFB is over 45 years old and is constructed of vitrified clay pipe or concrete. Due to the corrosive soil conditions and age of the system, much of the piping has disintegrated, leaving behind open underground voids. About 3,000 linear feet of the system was upgraded to PVC. The system contains three lift stations, two of which were renovated ten years ago and the third renovated in 2000. The 2003 General Plan classifies the

Altus AFB sanitary sewer system as "red", using the FIX system. This rating indicates that the system is in poor condition and requires repair or replacement (USAF 2003).

Altus AFB utilizes the City of Altus utilities for its sanitary sewer services and does not operate any wastewater treatment facilities. Altus AFB discharges to the City of Altus Wastewater Treatment Plant (WWTP) under the City of Altus Industrial Pretreatment Wastewater Discharge Permit. The plant's daily treatment capacity is four mgd with a peak daily flow of discharge of 0.8 mgd (USAF 2008c). In FY2007, Altus AFB discharged approximately 148 million gallons or 0.4 mgd of wastewater (USAF 2008c). Based on the effective population of 3,167, this translates to an average of 126 gallons per capita of daily wastewater generation at Altus AFB. The average overall discharge to the City of Altus WWTP, including discharge from Altus AFB, is 1.2 to 2.3 mgd, or 30-60 percent of the WWTP's capacity.

3.3.11.3 Solid Waste

All municipal solid waste generated at Altus AFB is collected and transported off-base by a local contractor. This waste is currently disposed of at the City of Altus Landfill, approximately 13 miles from Altus AFB. With a disposal area of approximately 420 acres, the City of Altus Landfill accepts approximately 36,104 tons of solid waste annually, including construction and demolition (C&D) waste. The City of Altus Landfill does not keep records of the total amount of C&D waste accepted annually (Combs 2008). Currently, the landfill has utilized 25 acres of the 420 acres of available land. Altus AFB disposed of 593.49 tons of solid waste to the City of Altus Landfill in FY2007 representing approximately two percent of the overall solid waste handled by the landfill (Combs 2008). Based on the effective population, this translates to 1.02 pounds per capita of daily solid waste generation.

Altus AFB also has a very active recycling program in the housing area. Recyclable materials are collected and processed at the designated recycling center on-base. Many military personnel, retirees, and dependents living off base also participate in the recycling program (USAF 2003).

Municipal solid waste management and compliance guidance at Air Force installations is established in AFI 32-7042, *Solid and Hazardous Waste Compliance*. AFI 32-7042 incorporates by reference the requirements of RCRA Subtitle D and all other applicable federal regulations, AFIs, and DoD directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record keeping and reporting; and recycling of solid waste, as addressed in AFI 32-7080, *Pollution Prevention Program*.

3.3.11.4 Drainage

The Altus AFB storm water drainage system is made up of a network of drainage pipes feeding into open earthen ditches. Drainage exits the Base from four outfall locations to the south and one to the east. The two main flood control systems on base include the floodway ditch running through the Capehart Family Housing area that empties into Stinking Creek, and the detention basin south of Great Plains Family Housing area. With the exception of flood prone areas in the northeast and southwest corners of the base, the storm water system performs adequately.

Floodplain areas are located on the northeast portion of the base (extending from the north end of the inside runway and impacting the assault strip and the outside runway), as well as the southwest portion (particularly at the front gate and in the family camping and recreation areas). Water backs up onto base property and floods low lying areas where Stinking Creek exits the base property and the creek channel narrows significantly (USAF 2003). There are approximately 741 acres of impervious cover currently on Altus AFB.

Altus AFB is currently permitted under the State of Oklahoma, ODEQ NPDES Multi-Sector General Permit Number OKGP01480. The multi-sector permit covers a broad list of industrial activities which include; airports, WWTPs, hazardous waste facilities, landfills and land application sites, scrap and waste material processing and recycling facilities, petroleum bulk oil stations and terminals, and transportation facilities. The permit does not, however, authorize storm water discharges associated with construction activities. A separate Notice-of-Intent and SWPPP must be filed with ODEQ for all new construction activities that disturb one or more acres. Under this permit, there are no analytical requirements for Altus AFB. Specific base efforts to reduce storm water pollution are documented in the base Multi-Sector General Permit SWPPP (USAF 2006a).

3.3.11.5 Transportation

Altus is easily accessible from the north and south by U.S. Highway 283 and from the east and west by U.S. Highway 62. The Altus AFB road network consists of approximately 20 percent rigid pavement and 80 percent flexible pavement. It is considered to be in good to excellent condition and adequately serves installation traffic. Three gates provide access to the installation – the main gate, the south gate, and the new north gate. The main gate is located on the west side of Altus AFB at the end of Falcon Road and is used by base personnel and visitors. The south gate is a low-use gate located next to the industrial and fuel storage areas. This gate is used by trucks carrying explosives and fuel supply trucks and is accessible from U.S. Highway 62 and Challenger Boulevard. The new north gate serves the family housing area (USAF 2003).

The Altus AFB General Plan indicates that the existing road network lacks hierarchy between the primary and secondary streets in that there is nothing to give the visual indication that one road is more dominant than another. This, combined with the angled streets and irregular intersections, could cause confusion in traversing the base. Recommendations for improvement included reconfiguring intersections to allow for a safer and more efficient traffic flow throughout the base, as well as identifying street hierarchy through use of landscaping, paving and curbing details, widening or lighting, and signage fixtures. It is unknown when the last transportation study was completed (USAF 2003).

3.3.11.6 Electricity and Natural Gas

Western Farmers Electric Cooperative supplies and regulates electrical service to Altus AFB from a 69 kilovolt transmission line that enters the Base on the south side of the Base. The transmission line enters the base at a substation, where the electricity is distributed to six circuits that distribute power throughout Altus AFB (USAF 2003). Total electrical consumption for FY2007 was approximately 63,369 megawatt-hours (MWhr) (USAF 2008c)-or approximately 174 MWhr per day. Based on the effective population, the per capita daily electrical

consumption rate was 0.05 MWhr in FY2007. The electricity provider has the capacity to produce 1,054 MWhr per day (USAF 2003). Altus AFB utilized 16.5 percent of the electricity provider's generation capacity. The 2003 General Plan classifies the Altus AFB electrical system as "yellow" based upon the FIX system. This rating indicates that the system is mission capable, but requires major repair or upgrade within five years of the designation (USAF 2003).

Natural gas is supplied to Altus AFB by CenterPoint Energy (USAF 2005c). The natural gas enters the base through an 8-inch buried coated steel pipe located near the southwest boundary of the installation (USAF 2003). The natural gas distribution system consists of polyethylene plastic lines with a design capacity of 134 thousand cubic feet (kcf) per hour (USAF 2005c). FY2007 on-base usage was approximately 193,912 kcf. The average daily demand was approximately 531 kcf and the peak average daily demand occurred during the month of January, with a use of 1,519 kcf per day (USAF 2008c). Based upon the effective population, the per capita daily natural gas consumption rate was 167.67 cf.

The 2003 General Plan classifies the Altus AFB natural gas distribution system as "yellow" based upon the FIX system. A yellow designation states that the system is mission capable, but requires major repair or upgrade within five years of the designation. The distribution system including distribution lines, mains, and service lines, are considered to be in good condition and will require moderate updating/construction to ensure future use and capability (USAF 2003). The main lines within the Capehart and Great Plains Family Housing are considered to be in excellent condition (USAF 2003).

3.3.12 Socioeconomic Resources

3.3.12.1 Population

An estimated 21,447 people, or 75.4 percent of the 2000 Jackson County population, reside in Altus City, with an average family size of 3.14 (USCB 2009a). The 2007 estimated population of Altus City was 19,329; this was a decrease from the 2000 estimated population of 21,447 (USCB 2009b). Altus City and Jackson County experienced a decrease in growth rate from 1990 to 2000. The population for Altus City decreased from 21,910 to 21,447 (a 2.2 percent decrease) from 1990 to 2000 (USCB 2009b). The population for Jackson County decreased from 28,764 to 28,439 (a 1.1 percent decrease) from 1990 to 2000 (USCB 2009a and USCB 2009c). In contrast, population growth for the state of Oklahoma from 1990 to 2000 was approximately 9.7 percent, and the nationwide population growth was 13.1 percent from 1990 to 2000 (USCB 2009a and USCB 2009c). According to the Oklahoma Department of Commerce, the population of Altus City is expected to increase by an average of 2.7 percent per year through the year 2030. This is an approximate 17.5 percent growth in population between 2000 and 2030 (Oklahoma Department of Commerce 2008).

Based on the General Plan-Based EIAP Capability Analysis, there are 803 military personnel living on base and 600 living off base. There are 1,280 active-duty military dependents living on base (1.6 dependents per military member)(USAF 2008d). The total on-base population at Altus AFB is 5,347 personnel, which includes military personnel (living on and off base), dependents, private business (including United States Postal Service employees, contractors, college instructors, and credit union/bank employees), and civilian personnel (USAF 2008d).

3.3.12.2 Housing

The Altus AFB Housing Requirements and Market Analysis (HRMA) for 2006 defines the housing market area as covering a 60-minute commute, or 20 miles, in private vehicles and assuming peak traffic conditions from Altus AFB's headquarters building or major work centers. The housing market area includes parts of the following counties: Jackson County and Tillman County, Oklahoma, and most of Wilbarger County, Texas (USAF 2006c). The HRMA analyzes data from 2006 and makes projections through 2011. In 2006, there were projected to be 8,370 rental units within the housing market area. The rental supply is expected to reach 13,648 units by 2011 (USAF 2006c). According to the 2006 HRMA, of the 8,370 rental units, 2,740 units (32.7 percent) were considered to be unsuitable by Air Force standards. Of the remaining 5,630 suitable rental units, an estimated 5,395 were occupied and 235 were vacant (USAF 2006c). As reported in the General Plan-Based EIAP Capability Analysis, there were 770 MFH units on Altus AFB, of which 75.8 percent are occupied (USAF 2008d). The MFH inventory at Altus AFB is expected to be reduced as part of privatization; the end state of MFH will be 726 units and will be completed by 2010.

3.3.12.3 Education

Children who live in permanent quarters on Altus AFB, as well as those living off base in Altus City, attend schools within the Altus Public School District. The Altus Public School District is made up of eight schools that serve to educate kindergarten through 12th grade students. This includes five elementary schools, one intermediate school, one junior high school, and one high school (Altus Public School District 2009a). According to the Altus Schools 2007-2008 State of the School Report, 3,865 students attend school within the district, with a 12.3:1 student to teacher ratio. The district has a student population consisting of the following background: 52.8 percent Caucasian/other non-Hispanic, 27.9 percent Hispanic, 13.7 percent Black, 3.1 percent Asian/Pacific Islander, and 2.5 percent Native American (Altus Public School District 2009b). It is assumed that the majority of elementary age students living on Altus AFB are enrolled at L. Mendel Rivers Elementary School, located on the installation. Older students living on base are likely enrolled at Altus Junior High School or Altus High School. Currently, the enrollment at L. Mendel Rivers Elementary School is 371 with a capacity of 600 (Holder 2009 and Wollenzin 2009). The enrollment at Altus Junior High School is 550 students with a capacity of 700, and the enrollment at Altus High School is 1051 students with a capacity of 1250 (Worbes 2009 and Haught 2009).

3.3.12.4 Economy

<u>Altus AFB Economic Activity and Contribution.</u> The following information is summarized from the FY2007 Altus Economic Impact Analysis (USAF 2007a).

Altus AFB generates economic activity in the region through employee payrolls, service contracts, construction programs, and other expenditures. The approximate 2007 payroll for military personnel (including active duty reserve and military trainees) living on base was 22.5 million and 66.7 million dollars for those living off base. The total 2007 payroll for both military and civilian was approximately 169.9 million dollars. Annual expenditures for service contracts, health, education, temporary duty, commissary, base exchange, and other materials

were approximately 22.2 million dollars. Construction program costs, including operations and maintenance, and medical construction, totaled 5.4 million dollars. The number of on base jobs, including both military and civilian, was 4,520. Thus, the total economic impact of Altus AFB on the surrounding community in FY2007 was 254.6 million dollars (USAF 2007a).

Regional Employment and Income. According to the U.S. Census Bureau's 2000 Census, per capita personal income in Altus City was 40.4 percent lower than the U.S. average (USCB 2009d and USCB 2009e). In 2000, the Altus City unemployment rate was 3.0 percent, which was lower than the state average for that period (3.3 percent of the working civilian population) and lower than the U.S. average (3.7 percent of the working civilian population) (USCB 2009d, 2009e, and 2009f). In Altus City, the leading non-governmental industries in 2000 were education, health, and social services (26.5 percent of the working civilian population); public administration (13.8 percent of the working civilian population); retail trade (12.5 percent of the working civilian population); and arts, entertainment, recreation, accommodation, and food services (10.5 percent of the working civilian population). An estimated 28.7 percent of the total labor force in Altus City work for federal, state, or local governments (USCB 2009d).

3.3.13 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, provides that "each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." In an accompanying Presidential memorandum, the President specified that federal agencies shall analyze the environmental effects of their proposed actions on minority and low-income communities, including human health, economic, and social effects when such analysis is required by NEPA.

This analysis follows the *Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process (EIAP)*, November 1997, and the CEQ Environmental Justice Guidance under NEPA, December 1997.

In order to determine if minority and low-income populations are disproportionately impacted by the Proposed Action or alternatives, two areas of comparison must first be determined:

- the area potentially affected by impacts from resources or ROI (i.e., air quality, noise, land use), and
- the larger regional community that includes the affected area and serves as a Community of Comparison (COC).

Depending on the Proposed Action or alternatives, each resource (i.e., air quality, noise, land use) can impact a different ROI. The ROI is the geographic area that would be adversely affected by a resource as a result of the proposed project. The ROI for this environmental justice analysis is the area within the boundaries of Altus AFB and the City of Altus. Since there is no demographic data available for Altus AFB, the demographic data for the City of Altus will be used for the environmental justice analysis of the entire ROI (both Altus AFB and the City of Altus). The COC is the regional area surrounding the ROI that is the demographic area used to

compare and analyze the potential environmental justice impacts that results in the identification of an environmental justice community. For this analysis the COC is Jackson County.

Disadvantaged groups within the ROI and COC, including low-income and minority communities, are specifically considered in order to assess the potential for disproportionate occurrence of impacts. For the purposes of this analysis, disadvantaged groups are defined as follows:

- *Minority Population:* Black or African Americans; American Indians and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and some other race. For the 2000 Census, race and Hispanic origin (ethnicity) were considered two separate concepts and were recorded separately. For the purposes of this analysis, the total minority race population will be separate from the total Hispanic population to determine total minority race population from the Hispanic total within the affected areas.
- *Low-Income Population:* Persons living below the poverty level, according to income data collected in U.S. Census 2000.

Altus AFB is located in Jackson County, within the city limits of Altus, Oklahoma. The City of Altus is located approximately 60 miles west of Lawton, 140 miles southwest of Oklahoma City and about 15 miles north of the Oklahoma/Texas border. In the year 2000, the population of the City of Altus was 21,447. Caucasians represented 72.6 percent of the population, minorities represented 23.8 percent of the total population, and Hispanics or Latinos represented 17.2 percent of the total population (USCB 2009g).

Census data for the year 2000 showed the population for Jackson County as being 28,439. Caucasians represented 76.1 percent of the population, minorities represented 20.4 percent of the total population, and Hispanics or Latinos represented 15.6 percent (USCB 2009g).

Based on the 2000 Census data, the incidence of persons in the City of Altus with incomes below the poverty level was 17.2 percent compared to 16.2 percent in Jackson County (USCB 2009h and USCB 2009i). Nationally, 12.4 percent of the population lives below the poverty level (USCB 2009j).

In 2000, the total population of the U.S. was 281,421,906. Minorities represented 22.4 percent of the population with 12.3 percent Black or African American; 0.8 percent American Indian and Alaskan Native; 3.6 percent Asian; 0.1 percent Native Hawaiian and Other Pacific Islander; and 5.5 percent some other race. A Hispanic or Latino ethnicity was reported by 12.5 percent of the population (USCB 2009g).

Table 3-11 summarizes census data on minority and low-income populations for the City of Altus and Jackson County. Additional information is provided for the state of Oklahoma and the U.S.

Table 3-11 Percent Minority and Low-Income Populations

Demographic Area	Total Population	Total Hispanic/ Latino Population	Percent Hispanic/ Latino	Total Minority Race Population[a]	Percent Minority Race	All Income Levels [b]	Total Low-Income Population	Percent Low Income
City of Altus	21,447	3,699	17.2	5,102	23.8	20,677	3,548	17.2
Jackson County	28,439	4,446	15.6	5,812	20.4	27,597	4,478	16.2
State of Oklahoma	3,450,654	179,304	5.2	666,235	19.3	3,336,224	491,235	14.7
United States	281,421,906	35,305,818	12.5	63,135,052	22.4	273,882,232	33,899,812	12.4

Source: USCB 2009g-2009k
Notes:
[a] Minority Race includes Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and some other race.
[b] All income levels includes everyone except those in institutions, military group quarters, and college dormitories, and unrelated individuals under 15 years old.

At least one criteria listed below must be met to determine if an environmental justice population is present:

- If the affected area's percentage of minority or low-income population is greater than that of the general population, the affected area is considered to be a minority or low-income population.
- If the minority population (including Hispanics or Latinos) or low-income population is greater than 50 percent, it is considered a majority-minority or majority low-income population.

Based on the criteria above, there is a minority and low-income population present within the area that would be impacted by construction and demolition activities, as well as changes to aircraft operations.

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Chapter 4

Environmental Consequences

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the potential environmental impacts that are likely to occur as a result of implementation of the proposed or alternative actions. The No-action Alternative provides a baseline against which the impacts of the proposed and alternative actions can be compared. A discussion of measures designed to minimize potential impacts is included as necessary. Any resultant irreversible or irretrievable commitments of resources are also noted. Criteria and assumptions used to evaluate potential impacts are discussed in each section. Note that impacts from the new closed traffic pattern are only discussed in detail in the Airspace Use and Management, Noise, and Land Use sections, as none of the other resource areas would be expected to be impacted by a change in air traffic patterns at Altus AFB.

4.2 CHANGE IN CURRENT MISSION

The activities associated with the proposed or alternative actions would not change the current mission of Altus AFB. They would continue to support and, in some areas, increase the current mission of the installation.

4.3 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.3.1 Airspace Use and Management

A significant impact to airspace management and use could occur if the Proposed Action or alternatives: 1) changes operations within airspace already designated for other purposes, 2) results in a need to designate controlled airspace where none previously existed, 3) results in a reclassification of controlled airspace from a less restrictive to a more restrictive classification, 4) restricts movement of other air traffic in the area, 5) conflicts with air traffic control in the region, or 6) results in a need to designate regulatory SUA.

4.3.1.1 Proposed Action

Under this alternative, flight operations would not be increased from the baseline setting described in Section 3.3.1 (Airspace Use and Management). Sorties would be generated at approximately the current rates and airfield operations would generally fall within the current levels of activity. However, a west VFR closed traffic pattern for the innermost runway (17R/35L) is proposed. Although sortie activity remains at the current activity, the proposed west VFR closed traffic pattern would account for approximately 40 percent of annual VFR closed traffic operations. Generally speaking, on an average busy day for Altus AFB, approximately three to nine percent of installation air traffic, depending upon the airframe type, would use this new pattern. Utilization rates for the SUA associated with Altus AFB would not change appreciably. No changes to SUA dimensions are proposed under this alternative.

Therefore, there would be no impacts to airspace use and management as a result of the Proposed Action.

4.3.1.2 No-action Alternative

Under this alternative, flight operations would not be increased from the baseline levels described in Section 3.3.1 (Airspace Use and Management). Furthermore, west VFR closed traffic operations would not be conducted to Runway 17R/35L. Therefore, there would be no change in impacts to airspace use and management as a result of the No-action Alternative and the affected environment would remain as described in Section 3.3.1.

4.3.1.3 Potential Development Alternative

The PDA would not change operations within airspace already designated for other purposes as the action occurs in airspace designated for the purpose of Altus AFB flight operations. In addition, the PDA would not result in a need to designate controlled airspace where none previously existed nor would it result in the reclassification of controlled airspace from a less restrictive to a more restrictive classification. Under the PDA, aircraft operations would increase by 57 percent. While notable, this level of activity would not be sufficient to make the airspace surrounding Altus AFB a candidate for Class C airspace, largely because that classification is primarily intended for air carrier airports emplaning over 250,000 passengers. The criteria for establishment and maintenance of the existing Altus Class D airspace are based on containing IFR arrival operations between the surface to 1,000 feet AGL and IFR departure operations to the floor of adjacent controlled airspace (FAA 2008b).

The PDA would not unduly restrict the movement of other air traffic in the area or create any conflicts with air traffic control in the region. This area of Oklahoma has a moderate to low population density. Consequently, the level of civil aviation activity is fairly moderate compared to other regions of the country. The Altus RAPCON controls all IFR traffic (civil and military) within the Class E airspace in the vicinity of Altus AFB. This allows the RAPCON to sequence civil users into public use airports in the vicinity and to use SUA for IFR traffic when it is not otherwise in use. The PDA would not create a need for additional or new controlled airspace, nor does its implementation require additional regulatory SUA (i.e. a Restricted or Prohibited area).

4.3.1.4 Measures to Reduce Impacts

No actions to mitigate the effects from the PDA on airspace use and management are proposed nor would they be necessary as a result of a potential 57 percent increase to flight operations. Existing ATC procedures are adequate to the task of providing aircraft separation services to participating users. Additionally, the Air Force proactively engages in a program of public outreach to aviators, publishing Mid-Air Collision Avoidance (MACA) guides at its bases, including Altus AFB. These brochures, distributed to fixed base operators at nearby airports, are primarily intended for pilots operating under VFR. The MACA contains information on preferred flight tracks, operational characteristics of high-performance military aircraft, and, points of contact to ascertain real-time status of SUA. Further, the FAA has an ongoing effort to provide real-time SUA status online so pilots of non-participating aircraft can factor anticipated

SUA usage and availability into their flight planning, minimizing unnecessary avoidance of inactive SUA.

4.3.2 Noise

When evaluating noise effects, several aspects are examined, including: 1) the degree to which noise levels generated by training and operations, as well as ongoing construction, demolition, and renovation activities are higher than the ambient noise levels; 2) the degree to which there is hearing loss and/or annoyance; and 3) the proximity of noise-sensitive receptors (i.e., residences) to the noise source. An environmental analysis of noise includes the potential effects on the local population. Such an analysis estimates the extent and magnitude of the noise generated by the proposed and alternative actions. For purposes of analysis of aircraft operations at Altus AFB, impacts could be considered significant if the Proposed Action or alternatives resulted in a three dB DNL increase in noise exposure at a sensitive receptor. In addition, based on AICUZ guidance, land-use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB DNL. As such, this can also provide an indicator as to when impacts could be considered significant.

For areas of predicted noise exposure with a value of less than the 65 dBA DNL level of exposure, a preferred method of analyzing potential impacts is to examine prevailing ambient noise levels at sensitive receptors and compare the predicted noise exposure from the Proposed Action or its Alternatives. It is useful to note that some increases of noise levels are not readily apparent to listeners. It is well accepted that sound level increases below three dBA are not perceptible. Additionally, it should be remembered that due to the logarithmic nature of the dB, a doubling of noise events creates a three dB increase. Table 4-1 presents noise levels and their corresponding perception.

Table 4-1 Decibel Changes and Perception

Changes in Noise Level (dB)	General Perception
3	Just Noticeable
5	More Noticeable
10	Twice As Loud
20	Much Louder

4.3.2.1 Proposed Action

Implementation of the Proposed Action includes no increase to sortie counts or aircraft operations. Flight operations would generally be of the quantities and intensities of present conditions. While it should be noted that aircraft operations counts can and do fluctuate from year to year, it is anticipated that their level at any given time generally approximates current levels of activity modeled for this report, approximately 159,000 annual operations. However, the proposed west VFR traffic pattern would absorb approximately 40 percent of the current east VFR traffic pattern operations. Generally speaking, on an average busy day for Altus AFB, approximately three to nine percent of installation air traffic, depending upon the airframe type, would use this new pattern.

Demolition and construction activities would occur as previously described in Table 2-2.

<u>*Aircraft Operations*</u>

Under the Proposed Action, flight operations would change compared to the No Action alternative (baseline) in that a substantial portion of the VFR closed traffic pattern operations would be shifted to the inside runway and therefore increased occurrences of aircraft overflight along the west side of the airfield would occur. Currently, aircraft performing VFR closed pattern operations from the inside runway do so to the east side of the base, as a general rule. Implementation of the Proposed Action would mean that all those VFR closed pattern operations would occur to the west. In addition, some closed pattern traffic operations that currently occur on the outside runway would be shifted to the inside runway. It is estimated that up to 40 percent of all VFR closed pattern traffic at Altus AFB would occur from the inside runway (i.e. to the west) upon implementation of the Proposed Action. Generally speaking, on an average busy day for Altus AFB, approximately three to nine percent of installation air traffic, depending upon the airframe type, would use this new pattern. Under the No Action Alternative, the relatively few VFR closed pattern operations from the inside runway are flown to the east side of the airfield.

While the operations along proposed VFR flight tracks by C-17 and KC-135 aircraft would be readily apparent and highly visible, their overall effect on the shape of the predicted noise exposure is fairly minor. Compared to the baseline set of noise contours shown in Chapter 3, the change in shape of the contours is slight, with changes occurring primarily at the ends of the contours. The noise contours widen slightly to the west (viewed along the north/south axis of the primary runway centerlines and extension). Similarly, along the east side of the airfield, the contours would become slightly narrower and would not extend as far out along the outside runway centerline. This result is expected and indicative of a greater percentage of VFR closed pattern operations occurring to and from the inside runway (Figure 4-1).

As noted in Section 3.3.2, the DNL is the preferred metric for assessing the impacts to the noise environment from aircraft operations. The DoD AICUZ program sets 65 dB DNL as the threshold for land-use planning purposes (see Section 3.3.2.1) because it correlates reasonably well with a rapid increase of the percentage of persons annoyed from noise.

The aggregate acreage predicted to be exposed to noise levels in excess of 65 dB DNL does not change substantially; in fact, a very slight reduction occurs (Table 4-2). Except for the 70 dB DNL contour, the number of off-base acres lying within an area of high noise exposure would be reduced. The number of off-base acres that would underlie a 65-70, 75-80, or 80+ dB DNL contour would be less than the No Action (baseline) noise setting. With respect to on-base land, the number of acres underlying the 65-70 db DNL contour would diminish whereas the number of acres underlying the 70-75, 75-80 and 80+ dB DNL contours would increase (Table 4-3). Taken as a whole, the slight increase in acreage occurring on the west side of the airfield is offset by the reductions occurring on the east side of the airfield. While the areas of greatest population around Altus AFB are west of the airfield compared to the relatively open areas north, south and east of the airfield, and this direction is the one toward which the expansion occurs, it is unlikely that a sensitive receptor would be able to discern much of a difference. The human ear typically cannot discern a difference in noise energy of less than three dB, an increase that correlates with a doubling of operations.

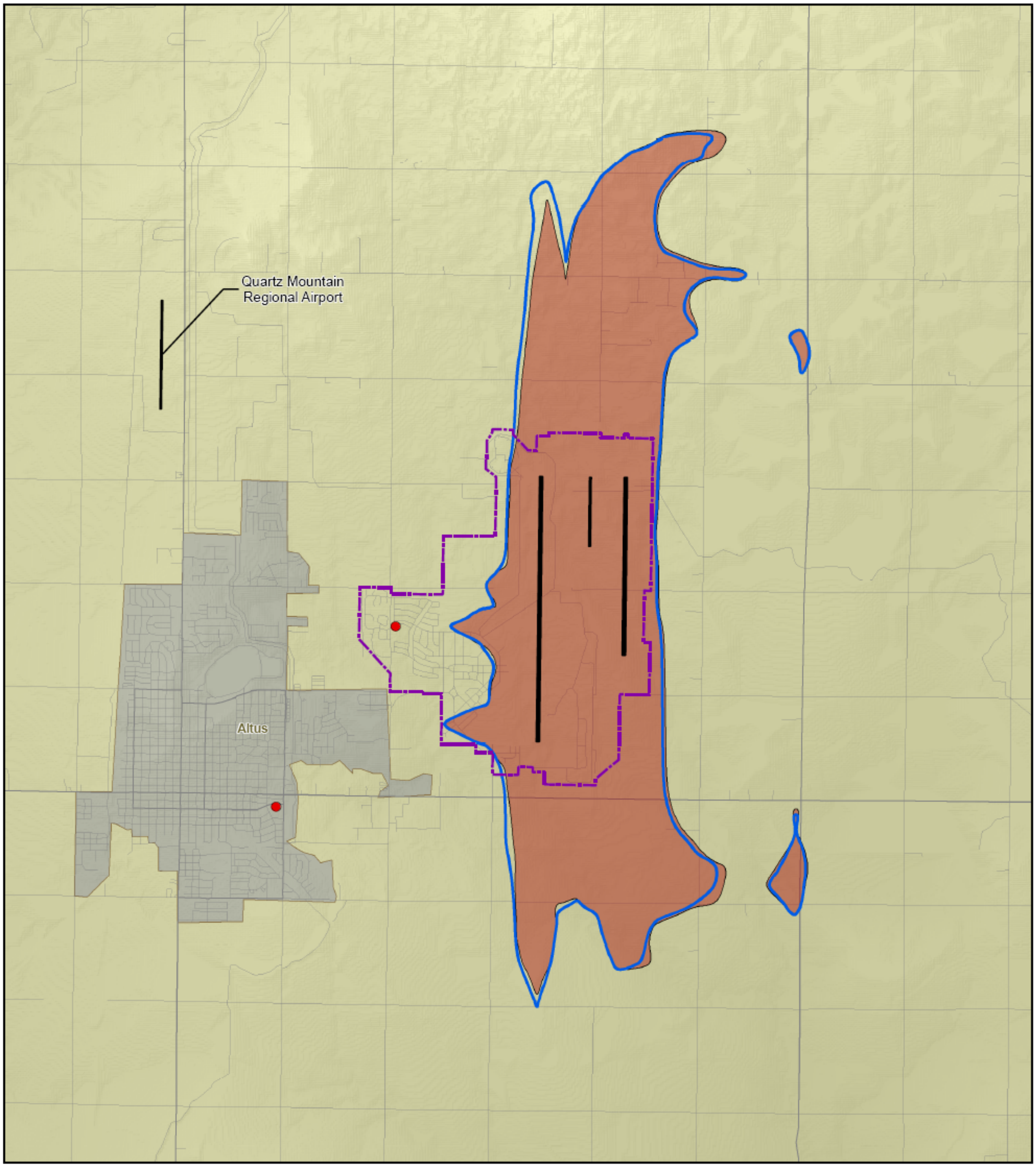

Figure 4-1
Comparison of
Baseline Noise Exposure
(2008 Baseline & Proposed Action)

Altus Air Force Base
Altus, OK

Table 4-2 Comparison of Total Land Area Exposed to Elevated Noise Levels Under the Proposed Action

Noise Level DNL	Baseline: Land Area (In Acres)	Proposed Action: Land Area (In Acres)
65 to 69	3,444.30	3,294.11
70 to 74	2,583.93	2,753.89
75 to 80	1,134.01	1,157.95
>80	414.46	402.05
Total	**7,576.70**	**7,608.00**

Source: USAF 2008a
DNL = Day-Night Average Sound Level

Table 4-3 Comparison of On- and Off-Base Land Area Exposed to Elevated Noise Levels Under the Proposed Action

Noise Level DNL	Baseline: Off-Base Land Area (In Acres)	Baseline: On-Base Land Area (In Acres)	Proposed Action: Off-Base Land Area (In Acres)	Proposed Action: On-Base Land Area (In Acres)
65 to 69	3,013.86	430.44	2,878.78	415.33
70 to 74	1,282.35	1,301.58	1,414.29	1,339.6
75 to 80	281.51	852.5	276.02	881.93
>80	17.37	397.09	3.66	398.39
Total	**4,595.09**	**2,981.61**	**4,572.75**	**3,035.25**

Source: USAF 2008a
DNL = Day-Night Average Sound Level

Table 4-4 presents a location identified by installation personnel as noise-sensitive receptors, the No Action (baseline) 2008 predicted noise exposure and the Proposed Action predicted noise exposure that would be expected if the Proposed Action were implemented. These receptors lie on the same side of the airfield as the proposed VFR closed traffic pattern. Implementing the Proposed Action would not increase the predicted noise exposure at these points by more than three dB DNL, nor would their DNL increase to 65 dB DNL or greater. Additional impacts associated with aircraft noise as they relate to land use are presented in Section 4.3.3.

Table 4-4 Proposed Action Noise Exposure at Sensitive Receptors

Point Identification	Location/Sensitive Receptor	Baseline: Noise Level (DNL)	Proposed Action: Noise Level (DNL)
1	Jackson County Memorial Hospital, OK 34° 38' 09.45" N; 99° 19' 03.91653" W	50.2 dB	51.1 dB
2	L. Mendell Rivers Elementary School, OK 34° 39' 40.84578" N; 99° 17' 52.85072"W	55.6 dB	55.9dB
Source: USAF 2008a			

Construction Activities
As noted in Section 3.3.2.2, noise associated with construction activities does not typically generate a predicted noise exposure of 65 dBA DNL or greater because even at extremely high rates of operation, the equipment itself does not generate noise so intense that averaged over a year it would produce a 65 dBA DNL. The nature of sound is such that the temporary noise effects from the operation of construction equipment are minor in comparison to the existing noise exposure from aircraft noise. In essence, the aircraft noise masks the noise from construction equipment, or stated another way, the overall contribution to the cumulative noise exposure from construction noise is small compared to the existing noise environment created by the operation of aircraft.

Since the contribution to the DNL by construction generated noise would be minimal (<64 dB DNL) and the location of construction equipment is unknown, it is not possible to determine whether operation of said equipment would cause the existing DNL contours to shift. Therefore, a detailed analysis of construction noise is not performed in this assessment. However, it is foreseeable that increased noise from construction activities may temporarily occur as a result of the Proposed Action. It would result from activities inherent in construction and demolition. These activities would produce noise generated by heavy equipment and vehicles involved in demolition, site preparation, foundation preparation, construction, and finishing work. There would be a possibility of short-term, localized speech interference or annoyance near construction zones. In addition, adherence to standard Air Force Occupational Safety and Health regulations minimizes the risk of hearing loss to construction workers. These regulations require hearing protection along with other personal protective equipment and safety training.

Noise-sensitive receptors would be exposed to construction noise intermittently, and only for the duration of the renovation project; therefore, an extended disruption of normal activities is not anticipated. Overall, impacts associated with construction noise would not be significant.

4.3.2.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline noise as described in Section 3.3.2.

4.3.2.3 Potential Development Alternative

If this alternative were selected and implemented, total flight operations would increase by 57 percent from 154,316 to 242,281 annually. As depicted in Table 2-3, the Air Force would increase C-17 *Globemaster* flying operations by 57 percent from approximately 48,236 per year in FY2008 to 75,735 in FY2012. Operations of the KC-135 *Stratotanker* would also increase by 57 percent from approximately 106,080 per year in FY2007 to 166,546 annual operations in FY2012.

Demolition and construction activities would occur as previously described in Table 2-4.

Aircraft Operations
Under the PDA, the noise contours would extend further outward along all axes compared to those associated with the Proposed Action. The noise contours would widen slightly to the west (viewed along the north/south axis of the primary runway centerlines and extension) due to the increased level of activity. Of greater significance, however, would be the wrapping around to the east of the 65 dB DNL contour. This contour in this area is associated with aircraft performing repetitive closed pattern operations overhead, flying along a fairly narrow corridor with little dispersion. This extension of the 65 dB DNL contour reflects an area that under the Proposed Action or the baseline conditions would have or does have a predicted noise exposure that, while close to 65 dB DNL, does not quite cross this threshold. Because the AICUZ program makes no specific recommendations for land uses in areas of less than 65 dB DNL, these areas are not shown; that is, the lowest level shown begins at 65 dB DNL. The increased level of operations associated with the PDA are enough to make an area of predicted noise exposure that was slightly less than 65 dB DNL become visible as its predicted noise exposure increases to greater than 65 dB DNL. Figure 4-2 shows the predicted noise exposure (noise contours) that would be expected if the PDA were implemented. A comparison of the Proposed Action and PDA predicted noise exposure contours is shown in Figure 4-3.

The resultant predicted noise exposure of 242,281 annual aircraft operations for the mix of aircraft found at Altus AFB is shown as a set of noise contours that are centered about the runways. Table 4-5 details the baseline and PDA total acreage present within each noise contour. Table 4-6 details the on- and off-base baseline and PDA acreage present within each noise contour. Selection and implementation of the PDA would increase the number of acres underlying the 65 dB DNL noise contours substantially. Off-base, most of this increase is attributable to the extension of the contour along the east side of the airfield, parallel with and displaced from the outside runway. On-base, the acreage within this contour is reduced as land that formerly would have been in this contour would then underlie the 70 dB DNL contour. For the 75 and 80+ dB DNL contours, the number of acres, both on- and off-base, underlying these contours would increase. Under the loudest contour (i.e., 80+ DNL), the number of on-base acres that would increase exceeds the increase in acres off-base. This result would be expected since this contour would be closest to the runway and noise diminishes with distance from its source.

Table 4-5 Comparison of Total Land Area Exposed to Elevated Noise Levels Under the Potential Development Alternative

Noise Level DNL	Baseline: Land Area (In Acres)	Potential Development Alternative: Land Area (In Acres)
65 to 69	3,444.30	5,238.71
70 to 74	2,583.93	2,766.77
75 to 80	1,134.01	1,940.87
>80	414.46	673.06
Total	**7,576.70**	**10,619.41**

Source: USAF 2008a
DNL = Day-Night Average Sound Level

Table 4-6 Comparison of On- and Off-Base Land Area Exposed to Elevated Noise Levels Under the Potential Development Alternative

Noise Level DNL	Baseline: Off-Base Land Area (In Acres)	Baseline: On-Base Land Area (In Acres)	Potential Development Alternative: Off-Base Land Area (In Acres)	Potential Development Alternative: Off-Base Land Area (In Acres)
65 to 69	3,013.86	430.44	4,866.49	3,72.22
70 to 74	1,282.35	1,301.58	1,890.27	876.5
75 to 80	281.51	852.5	625.92	1,314.95
>80	17.37	397.09	43.18	629.88
Total	**4,595.09**	**2,981.61**	**7,425.86**	**3,193.55**

Source: USAF 2008a
DNL = Day-Night Average Sound Level

Table 4-7 presents the same two locations identified by installation personnel as noise-sensitive receptors, the baseline 2008 predicted noise exposure and the 2012 predicted noise exposure that may be expected if the PDA were implemented. Selection and implementation of this alternative would neither increase the predicted noise exposure by three dB DNL nor increase it to 65 dB DNL or greater. Additional impacts associated with aircraft noise as they relate to land use are presented in Section 4.3.3.

Table 4-7 PDA Noise Exposure at Sensitive Receptors

Point Identification	Location/Sensitive Receptor	Baseline: Noise Level (DNL)	Potential Development Alternative: Noise Level (DNL)
1	Jackson County Memorial Hospital, Altus, OK 34° 38’ 09.45” N; 99° 19’ 03.91653” W	50.2 dB	53.1dB
2	L. Mendell Rivers Elementary School, Altus, OK 34° 39’ 40.84578” N; 99° 17’ 52.85072”W	55.6 dB	57.8 dB
Source: USAF 2008a			

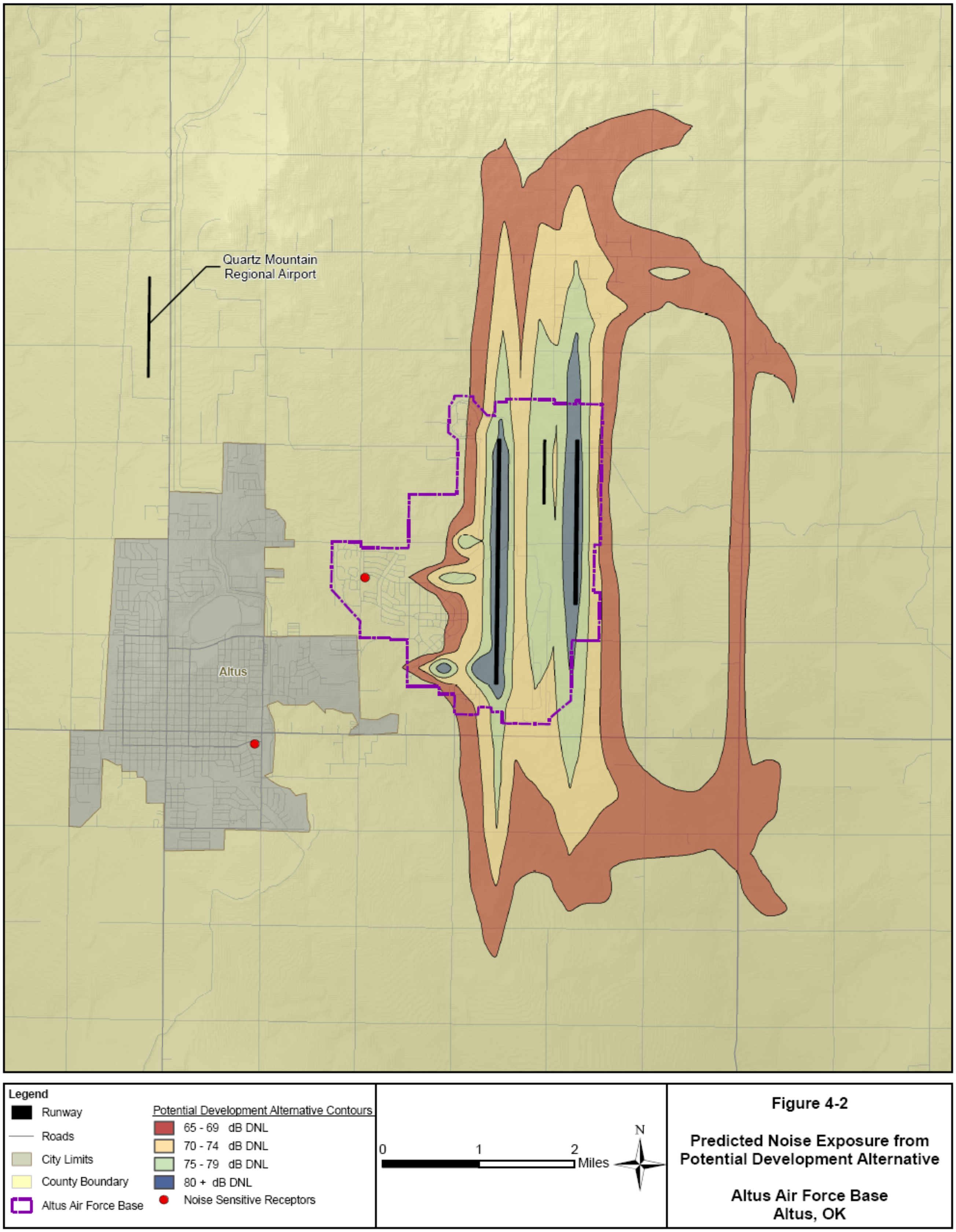

Figure 4-2

Predicted Noise Exposure from Potential Development Alternative

Altus Air Force Base
Altus, OK

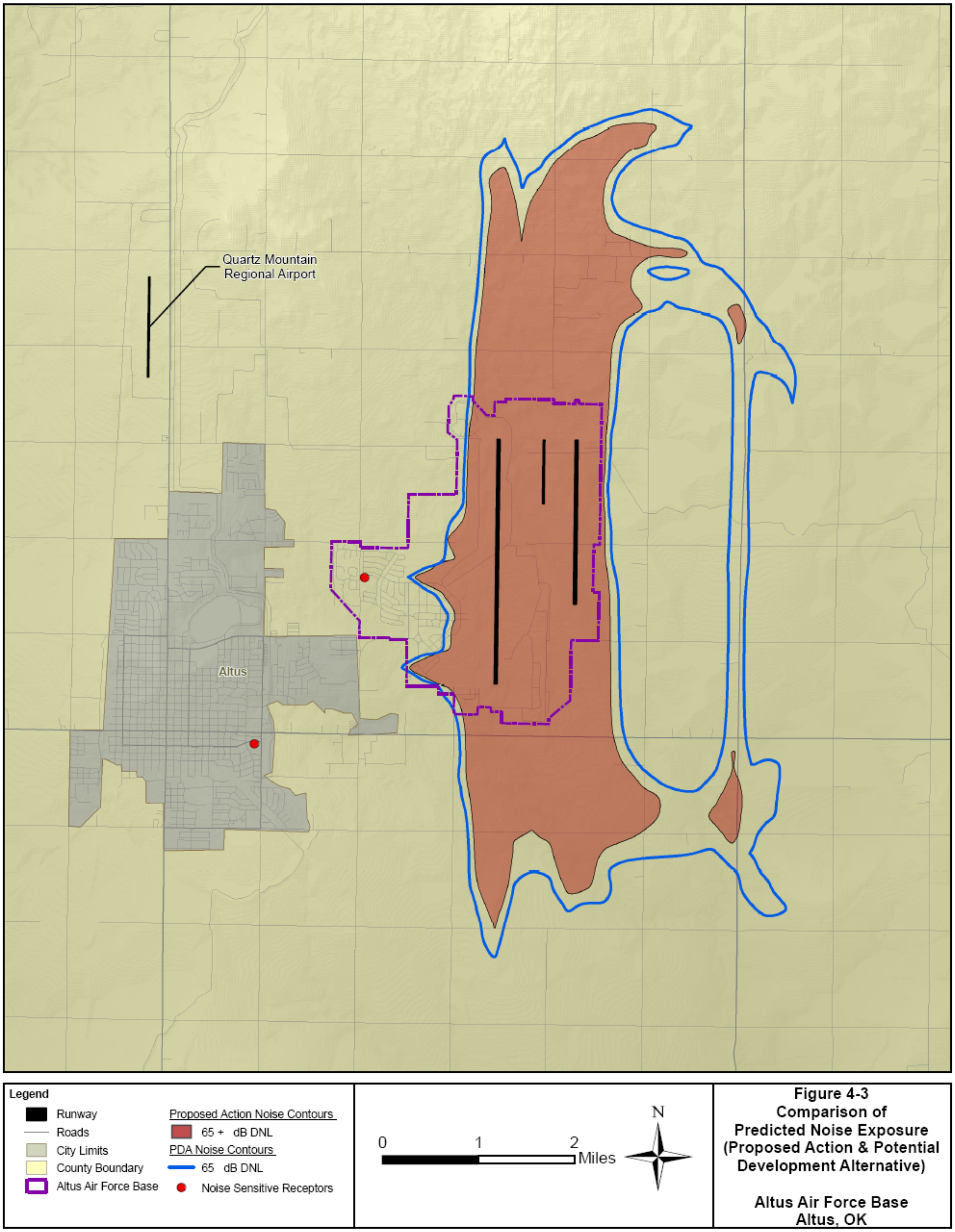

Figure 4-3
Comparison of Predicted Noise Exposure (Proposed Action & Potential Development Alternative)

Altus Air Force Base
Altus, OK

Construction Activities
The effect from operation of construction and demolition equipment would be similar to, but somewhat greater than those described for the Proposed Action. Selection and implementation of this alternative would indicate a greater level of ongoing construction activity for the time span of the PDA.

As noted in Section 3.3.2.2, noise associated with construction activities does not typically generate a predicted noise exposure of 65 dBA DNL or greater because even at extremely high rates of operation, the equipment itself does not generate noise so intense that averaged over a year would produce a 65 dBA DNL. As with the Proposed Action, the contribution to the DNL by construction generated noise would still be expected to be under thresholds of annoyance (<64 dB DNL) and the location of construction equipment would be unknown. It is not possible to determine whether operation of said equipment would cause the existing DNL contours to shift. Therefore, a detailed analysis of construction noise is not performed in this assessment. However, it is foreseeable that increased noise from construction activities may temporarily occur as a result of the PDA. The causes and effects would be similar to but likely of longer duration than those described for the Proposed Action.

Noise-sensitive receptors would be exposed to construction noise intermittently, and only for the duration of the renovation project; therefore, an extended disruption of normal activities is not anticipated. Overall, impacts associated with construction noise would not be significant.

4.3.2.4 Measures to Reduce Impacts

The Air Force engages in a program of extensive outreach to local communities to facilitate land-use planning to foster the establishment of compatible uses in the vicinity of its installations. The AICUZ program at Altus AFB is an ongoing process. Additionally, the nature of training operations at Altus AFB tends to reduce adverse noise effects and annoyance in that less than ten percent of flight operations and ground engine runs occur between 10:00 pm and 7:00 am.

Though the effects from construction noise are considered minimal, there are several BMPs that can be employed to further reduce the effect on residential areas. One BMP is to restrict the operation of extremely noisy equipment (e.g., brick cutters or jackhammers) before 9:00 am and after 5:00 pm. Other BMPs to reduce construction-associated noise include utilizing properly operating and maintained equipment (e.g., possessing mufflers, gaskets, sharpened and lubricated blades), maximizing the distance of loud equipment from a residence, directing equipment to use less noise-sensitive routes, fitting silencers to combustion engines, fastening machinery covers or panels tightly, isolating vibrating parts/damping, constructing sound barriers to reduce propagation, or shutting off/idling machinery between work periods (Tempest 1985; Eaton 2000; Suter 2002).

4.3.3 Land Use

A comparative methodology was used to determine impacts to land-use resources at Altus AFB. Facility operations and any construction or modification activities associated with each

alternative were examined and compared to existing land-use conditions and land-use plans. Impacts were identified as they relate to changes in land ownership and use classifications, extent of changes, potential conflicting uses on- and off-base, and accessibility concerns.

The Air Force AICUZ was described in Section 3.3.2. It is part of a broader effort undertaken by the military to identify and quantify shared natural assets, thereby allowing military installations to discourage encroachment by incompatible, off-installation uses. The Air Force implementation of this effort, the Natural Infrastructure Assessment process, is a multi-disciplinary planning study that examines resources such as airspace, water supply, air quality, frequency, and land use (USAF 2008c).

The Proposed Action or its alternatives could have a significant effect if they: 1) conflict in substantial fashion with existing land uses and master planning efforts undertaken by the installation or 2) conflict in substantial fashion with off-base land uses and master planning efforts of surrounding jurisdictions.

4.3.3.1 Proposed Action

4.3.3.1.1 Aircraft Operations

Implementation of the Proposed Action would result in changes to, but not necessarily increases in, predicted noise exposure stemming from increased aircraft operations. Figure 4-4 shows a comparison of the on-base land use with the baseline and Proposed Action noise contours overlaid. The land area embraced within the noise contours would change slightly. The off-installation change in predicted noise exposure was presented in Section 4.3.2, Noise.

Under the Proposed Action, there would be no effect on land use either on or off the installation from flight operations. On-base land-use planning efforts pertaining to aircraft noise, accident potential, and limiting obstructions to air navigation would continue under the existing regulations. Other than the noise contours, none of those planning inputs would change. The Air Force would continue to encourage surrounding jurisdictions to be cognizant of the land-use implications arising from aircraft operations with respect to noise, accident potential and navigable airspace. Installation leadership and community planners would continue to collaborate with officials in surrounding jurisdictions to promote land-use patterns consistent with ongoing operation of a significant military installation. As noted in Section 4.3.2, Noise, and in Section 3.3.3, Land Use, the net acreage change between baseline noise contours and those associated with the Proposed Action is negligible and previous AICUZ and JLUS recommendations were predicated on a different aircraft mix generating much larger contours. Land-use recommendations and implementation strategies contained in the 1999 JLUS would continue in force as future missions may yet again replicate the contours shown in those studies.

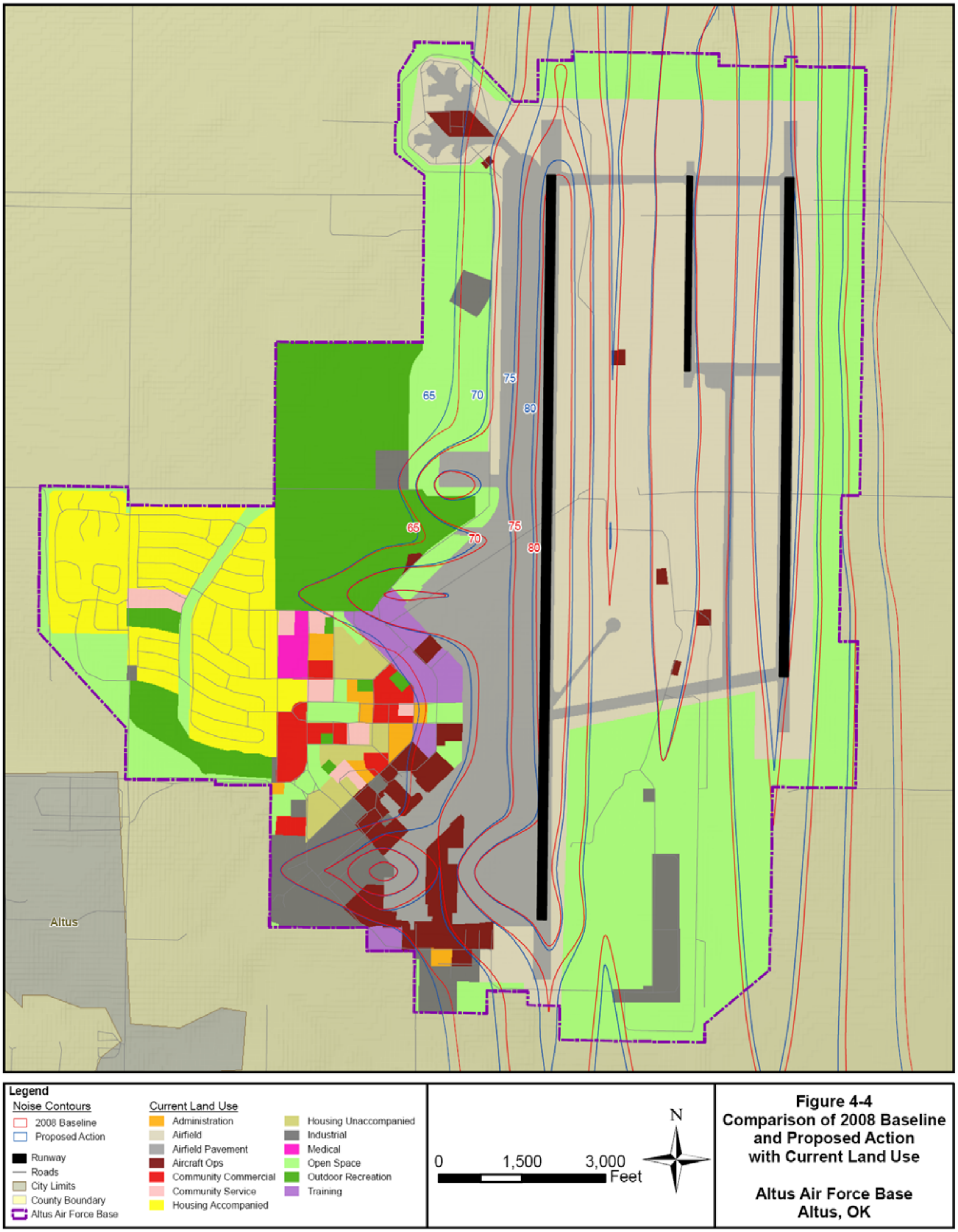

Figure 4-4
Comparison of 2008 Baseline and Proposed Action with Current Land Use

Altus Air Force Base
Altus, OK

4.3.3.1.2 Land-Use Changes and Construction Projects

The projects identified in the Proposed Action generally conform with and are identified in the General Plan. The proposed construction would occur in areas designated for such activities in the Altus AFB General Plan. The Proposed Action would be compatible with existing land use in the vicinity of the projects. Approximately 235,000 SF of new construction would occur as a result of implementing the projects under the Proposed Action. The Air Force site selection and design planning process generally assures compliance with Air Force regulations pertaining to compatible land use, AICUZ, and prevention of obstructions to air navigation.

Under the Proposed Action, there would be no expected conflict with off-installation planning efforts undertaken by surrounding jurisdictions. Most of the boundary areas of the installation are open space and for much of the installation, the land-use interactions between Altus AFB and surrounding communities are buffered agricultural land. Effects arising from construction projects and resultant land-use changes would be confined to the installation.

4.3.3.2 No-action Alternative

There would be no change in impacts to land use if the No-action Alternative were selected. Existing land-use patterns and development trends would continue on Altus AFB and off base, as described in Section 3.3.3.

4.3.3.3 Potential Development Alternative

In general terms, the PDA would alter existing land-use classification by converting approximately 384 unconstrained developable open space to developed uses as outlined in Section 2.5.1.2 and the 2008 Altus AFB Capability Analysis. The particular locations of these changes are not yet defined; instead, the conversion of land use would be from unconstrained developable open space to the remaining land-use classifications in a manner that attributes the future land use in the same proportions as currently exist.

4.3.3.3.1 Aircraft Operations

Implementation of the PDA would result in an increase in predicted noise exposure stemming from increased aircraft operations. Figure 4-5 shows a comparison of the on-base land use with the Proposed Action and PDA noise contours overlaid. The land area embraced within the noise contours would expand as the contours shifted westward. Based upon review of aerial photography and existing land use data in the installation AICUZ report, the areas underlying the contours would remain compatible. No sensitive noise receptors were identified within the expanded noise footprint. The contours generally would overlie industrial, office, and open space uses. The off-installation change in predicted noise exposure was presented in Section 4.3.2, Noise. Implementation of PDA would cause the 65 dB DNL contour to shift westward and slightly off the installation in the southwest corner of the base. The contour already extends off-installation to the north, south, and east.

With implementation of the PDA it would be possible, but not likely, that the increased noise from aircraft operations would be perceptible to some on-base residents. The 65-80+ dBA DNL

contours do not embrace base housing areas that lie along the west side of the runway complex. The PDA would increase the predicted noise exposure occurring from Altus AFB flight operations by approximately two to three dBA DNL, depending upon the location, compared to the Proposed Action. The noise contours shift outward with respect to the runways. However, as noted in Section 4.3.2, Noise a change of less than three dBA DNL is not ordinarily perceptible.

Areas around Altus AFB would remain subject to noise levels of 65 dB DNL or greater, but land uses generally remain compatible within these levels. A review of the noise analysis presented in Section 4.3.2 indicates that most of the real estate exposed to a slight increase in DNL from the PDA is either part of Altus AFB and agricultural land. Portions of the areas experiencing an increase in noise exposure may include open space, residential and commercial land. The area surrounding Altus AFB is already subjected to flight activity, including regular low-level overflights of military aircraft arriving and departing from the airfield. However, most of the land is for agricultural purposes. The recommended land uses and strategies for achieving compatibility with aircraft noise would remain the same.

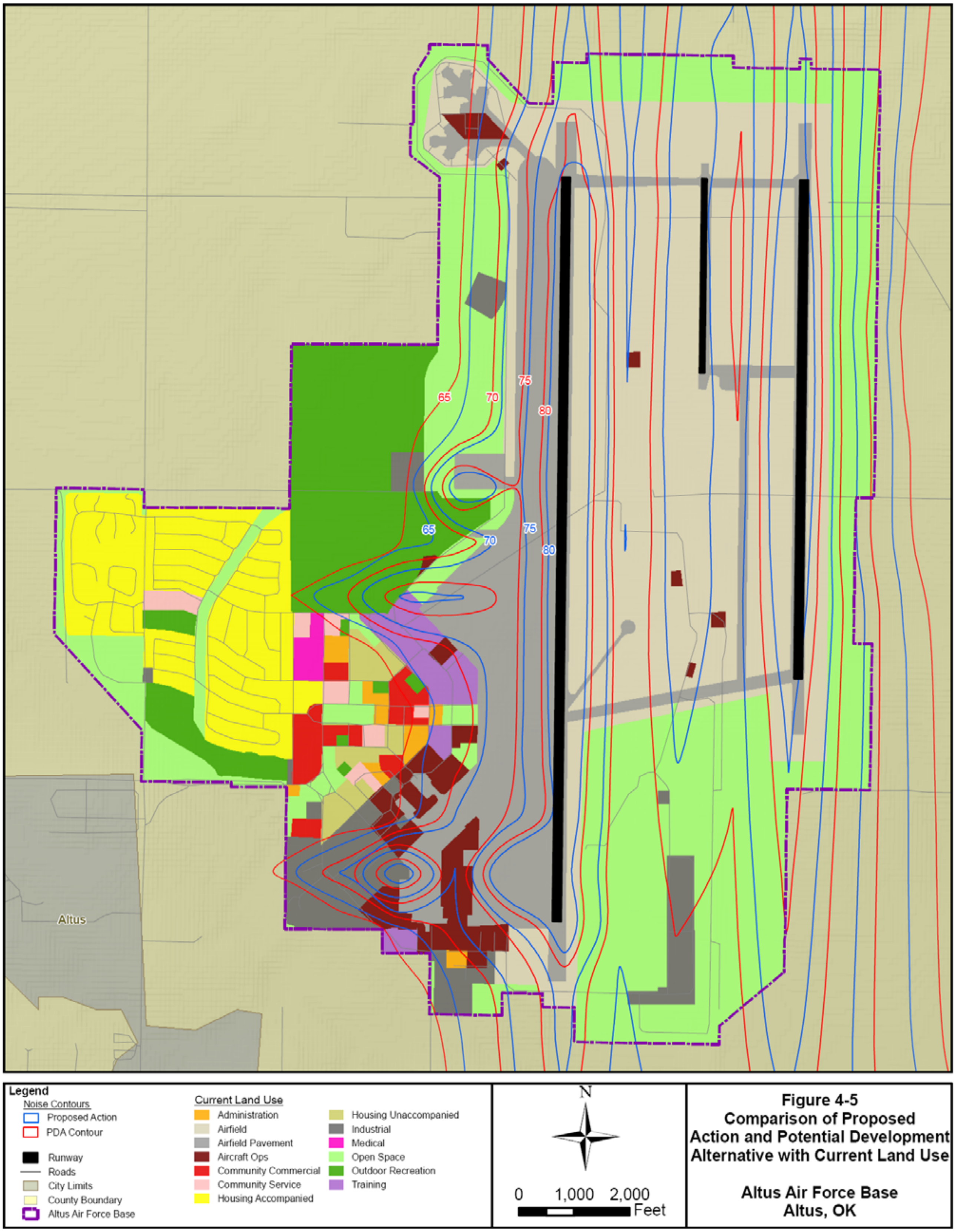

Figure 4-5
Comparison of Proposed Action and Potential Development Alternative with Current Land Use

Altus Air Force Base
Altus, OK

4.3.3.3.1 Land-Use Changes and Construction Projects

Land-use resources would not be negatively impacted under this alternative. The proposed land-use changes from unconstrained, developable open space to the other land uses identified on the installation would by definition only occur in areas that would not create land-use conflicts due to munitions safety considerations, aircraft operations and environmental concerns. Approximately 1.2 million SF of new construction and renovation would occur as a result of implementing the projects in the PDA.

The land-use changes and particular facility projects identified in the PDA, while not identified in the General Plan, would nonetheless still be undertaken in compliance with AFI 32-7062 Air Force Comprehensive Planning. In fact, identification of potential development opportunities and development of plans that would capitalize upon those opportunities are one of the objectives outlined in the AFI for an installation comprehensive plan. Adherence to the site selection and facility design process outlined in the AFI would generally assure that land-use changes and projects contained within the PDA are compatible with existing land use in the vicinity of the projects, would not be incompatible with respect to AICUZ land-use recommendations, and would not result in the construction of an obstruction to air navigation. By virtue of the acres being unconstrained, incompatibilities' arising from the land's having environmental, cultural resource, or other issues would, by definition, not occur. Further, Air Force regulations governing programming of funding, development of detailed site plans and construction drawings, and the letting of construction contracts would require individual records of environmental consideration, including compliance with NEPA and other pertinent environmental and occupational health and safety regulations.

There would be no conflict with off-installation planning efforts undertaken by surrounding jurisdictions as land-use changes would be confined to the installation. Most of the boundary areas off the installation are open space.

4.3.3.4 Measures to Reduce Impacts

The Air Force engages in a program of extensive outreach to local communities to facilitate land-use planning to foster the establishment of compatible uses in the vicinity of its installations. The AICUZ program at Altus is an ongoing process. Periodically, as aircraft operations change, an updated AICUZ study would be prepared and updated noise contours and compatible land-use planning recommendations would be furnished to the adjacent municipalities. Additionally, the nature of flight operations at Altus AFB tends to reduce adverse noise effects and annoyance in that less than ten percent of flight operations and ground engine runs occur between 10:00 pm and 7:00 am.

Whether on- or off-base, the adverse effects that normally would be anticipated from the PDA would be reduced by the ordinary noise attenuation that occurs with modern construction techniques and with specialized interior NLR that would occur by minimizing openings from doorways, windows, chimneys and plumbing vent stacks. The indoor NLR expected from these improvements is approximately 20 dBA.

4.3.4 Air Quality

The following factors were considered in evaluating air quality: (1) the short- and long-term air emissions generated from construction, renovation, and demolition activities, as well as changes in aircraft operations; (2) the type of emissions generated; and (3) the potential for emissions to result in ambient air concentrations that exceed one of the NAAQS or SIP requirements. As indicated in Section 3.3.4.3, the ACQR that includes Altus AFB is currently designated as an attainment area for all criteria pollutants. Therefore, Altus AFB is not subject to the General Conformity regulations. For the purposes of this analysis, impacts to air quality could be considered significant if emissions from the proposed or alternative actions would be considered regionally significant by the USEPA. The air emission calculations for the proposed and alternative actions included in the sections below are detailed in Appendix C.

4.3.4.1 Proposed Action

The Proposed Action would result in short-term emissions during construction, renovation (primarily pavement removal), demolition, and associated infrastructure, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. There would be minimal ambient air impacts from these localized ground level short-term emissions that would quickly dissipate away from the activity source. There would be no or a negligible increase in long-term emissions as it is assumed that POV and government vehicle use would remain relatively the same and the Proposed Action would not involve any changes in facility mission or operations. Stationary source emissions are assumed to remain the same. New equipment installed at the base would be more efficient and have lower emissions than the equipment currently present. It is also possible that the installation or modification of any air emission sources, such as boilers and heaters, emergency generators, paint booths, degreasers, etc., may trigger permitting requirements with the ODEQ's Division of Air Quality.

The combustion of fuel by the construction equipment and related vehicles involved in the Proposed Action would cause an increase in CO, VOC, NO_x, SO_2, and PM_{10} and $PM_{2.5}$. Fugitive dust would be created by the construction equipment as it disturbs soils.

The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked on and the level of construction activity. Western Regional Air Partnership (WRAP) developed a fugitive dust handbook that addresses the estimation of uncontrolled fugitive dust emissions and emission reductions achieved by demonstrated control techniques for eight major fugitive dust source categories. The handbook focuses on fugitive dust emissions "at the source" and does not evaluate factors related to the transport and impact of emissions on downwind locations. The methods for estimating emissions draw from: (a) established methods published by the USEPA, specifically AP-42: Compilation of Air Pollutant Emission Factors; and (b) from alternate methods adopted by state and local air control agencies in the WRAP region such as the California Air Resources Board, Clark County, Nevada, and Maricopa County, Arizona. Sources of data are identified and default values for emission factor correction parameters, source extent/activity levels, control efficiencies, and emission reductions by natural mitigation and add-on control measures are provided. The fugitive dust emissions from construction and demolition used the average emission factors provided in Section 3.2 of the WRAP Fugitive Dust Handbook (WRAP 2004). Because $PM_{2.5}$ emissions factors have not

been developed for all operations, it is conservatively assumed that $PM_{2.5}$ emissions are equivalent to PM_{10} emissions. The emissions presented in Table 4-1 include the estimated annual PM_{10} and $PM_{2.5}$ emissions associated with the uncontrolled fugitive dust emissions from the construction, renovation, and demolition sites. These emissions would produce slightly elevated short-term PM_{10} ambient air concentrations. The USEPA estimates that the effects of fugitive dust from construction activities would be reduced significantly with an effective watering program. Watering the disturbed area of the construction site twice per day with approximately 3,500 gallons per acre per day would reduce total suspended particulate emissions as much as 50 percent (USEPA 1995). The effects from fugitive dust would last only as long as the duration of construction activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Specific information describing the types of construction equipment required for a task, the hours the equipment is operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using experience with similar types of construction projects (Means 1996). Combustive emissions from construction equipment exhaust were estimated by using USEPA-approved emissions factors for heavy-duty diesel-powered construction equipment (USEPA 1991 and USEPA 2000) along with the emission factors for the estimated types and numbers of equipment expected to be used during construction. These emissions are included in Table 4-8. As with fugitive dust emissions, the construction, renovation, and demolition equipment emissions would produce slightly elevated air pollutant concentrations. However, the effects from construction, renovation, and demolition activities would last only as long as the duration of the activity, fall off rapidly with distance from the construction site, and would not result in long-term impacts.

Emissions for the Proposed Action are summarized in Table 4-8 and would occur as a result of construction, renovation, and demolition activities. The Proposed Action would not involve any changes in facility mission or operations, and there would likely be little or no increase in the number of personnel employed at the facility. Therefore, long-term emissions are not expected to increase. In fact, it is likely that long-term air emissions would be reduced as operations move into the new facilities because updated controls would be included in the new buildings.

Review of emissions from the Proposed Action in Table 4-8 indicates that the greatest percentage of impact to the local emissions in a given year during the project would be SO_x (8.5 tpy increase) at 7.7 percent from the combined construction, renovation, and demolition operations during year 2015 of the project. The emissions would be temporary and would be eliminated after the activity is completed. All emissions would fall below the ten percent level that would be considered regionally significant by the USEPA.

The emission of minor amounts of air pollution would be unavoidable; however, the individual and cumulative impacts during construction, renovation, and demolition would not be significant when compared to the 2002 Jackson County emissions.

Table 4-8 Expected Emissions for Proposed Action Construction/Renovation/Demolition By Year

	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$[(a)]
2010 Proposed Action (tpy)	19.9	**20.1**	42.1	4.5	44.5	44.5
2011 Proposed Action (tpy)	7.8	2.0	14.6	1.5	10.0	10.0
2012 Proposed Action (tpy)	13.0	19.8	22.8	2.2	**135**	**135**
2014 Proposed Action (tpy)	9.3	5.3	18.8	2.0	12.9	12.9
2015 Proposed Action (tpy)	**34.3**	6.0	**78.0**	**8.5**	50.7	50.7
2002 Jackson County, OK (tpy)[(b)]	12,100	1,530	1,398	111	7,720	7,720
Greatest Percent of Regional Emissions	0.28	1.3	5.6	7.7	1.7	1.7

Notes:
CO = carbon monoxide
NO_x = nitrogen oxides
OK = Oklahoma
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than ten micrometers in diameter
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound
(a) $PM_{2.5}$ emissions assumed = PM_{10} emissions.
(b) Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources in Jackson County, Oklahoma. Source: USEPA AIRData; Emissions come from an extract of USEPA's National Emissions Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html

4.3.4.2 No-action Alternative

Under the No-action Alternative, there would be no change in the Altus AFB emissions described in Section 3.3.4.

4.3.4.3 Potential Development Alternative

As in the Proposed Action, the PDA would result in short-term emissions during construction, renovation (primarily pavement removal), demolition, and associated infrastructure, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. There would be minimal ambient air impacts from these localized ground level short-term emissions that would quickly dissipate away from the activity source. The additional 426 personnel would increase long-term emissions from government and POV use. The implementation of more stringent air pollution controls on motor vehicles would reduce the emissions from government and POVs. Stationary source emissions are assumed to remain relatively the same. New equipment installed at the base would be more efficient and have lower emissions than the equipment currently present. It is also possible that the installation or modification of any air emission sources, such as boilers and heaters, emergency generators, paint booths, degreasers, etc., may trigger permitting requirements with the ODEQ's Division of Air Resources Management

Emissions for the PDA are summarized in Table 4-9 and would occur as a result of construction, renovation, and demolition activities. Review of emissions from the PDA in Table 4-9 indicates

that the greatest percentage of impact to the local emissions in a given year during the project would be SO_x (9.7 tpy increase) at 8.7 percent from the combined construction, renovation, and demolition operations during year 2015 of the project. The emissions would be temporary and would be eliminated after the activity is completed. All emissions would fall below the ten percent level that would be considered regionally significant by the USEPA.

The emission of minor amounts of air pollution would be unavoidable; however, the individual and cumulative impacts during construction and demolition would not be significant when compared to the 2002 Jackson County emissions.

Table 4-9 Expected Emissions for PDA Construction/Renovation/Demolition By Year

	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$[(a)]
2010 Proposed Action (tpy)	26.6	**51.5**	53.7	5.8	64.2	64.2
2011 Proposed Action (tpy)	14.6	33.4	26.2	2.8	29.7	29.7
2012 Proposed Action (tpy)	19.8	51.2	34.4	3.5	**154**	**154**
2014 Proposed Action (tpy)	16.0	36.7	30.4	3.3	32.6	32.6
2015 Proposed Action (tpy)	**41.0**	37.4	**89.6**	**9.7**	70.4	70.4
2002 Jackson County, OK (tpy)[(b)]	12,100	1,530	1,398	111	7,720	7,720
Greatest Percent of Regional Emissions	0.34	3.4	6.4	8.7	0.91	2.0

Notes:
CO = carbon monoxide
NO_x = nitrogen oxides
OK = Oklahoma
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than ten micrometers in diameter
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound
(a) $PM_{2.5}$ emissions assumed = PM_{10} emissions.
(b) Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources in Jackson County, Oklahoma. Source: USEPA AIRData; Emissions come from an extract of USEPA's National Emissions Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html.

Upon completion of the PDA, aircraft operations would be anticipated to increase 57 percent from that of the 2008 baseline and Proposed Action. Therefore, annual long-term emissions from aircraft operations would increase. The Emissions and Dispersion Modeling System (EDMS, Version 5.1) was chosen to assess the potential annual increase in air emissions from aircraft and associated ground support equipment. The model was developed by the FAA in cooperation with the USAF. EDMS is the FAA required and the USEPA preferred model for the assessment of aviation-related sources of criteria air pollutants. To estimate the annual emissions for the 2008 Baseline and the PDA, the aircraft type and annual operations from Table 2-3 were used with EDMS (EDMS 2008) default parameters for Altus AFB. The EDMS model inputs are included in Appendix C.

The long-term annual emission increase for the PDA are summarized in Table 4-10 and would occur as a result of the 57 percent increase in aircraft operations and an additional 426 personnel

on base. All emissions would fall below the ten percent level that would be considered regionally significant by the USEPA.

Table 4-10 Long-term Annual Emissions from Increased Aircraft Operations

	CO	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$[(a)]**
PDA Aircraft Operations (tpy)	292	19.3	297	30.6	0.60	0.60
2008 Baseline Aircraft Operations (tpy)	187	12.6	194	19.7	0.62	0.62
Increase in Annual Emissions from Government and POV (tpy)	4.5	0.49	0.44	7.87E-03	0.068	0.068
Total Increase in Annual Emissions (tpy)	110	7.2	103	10.9	0.048	0.048
2002 Jackson County, OK (tpy)[b]	12,100	1,530	1,398	111	7,720	7,720
Percent of Regional Emissions	0.90	0.47	7.4	9.8	6.22E-04	6.22E-04

Notes:
CO = carbon monoxide
MSA = Metropolitan Statistical Area
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than ten micrometers in diameter
POV = privately owned vehicle
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound
(a) $PM_{2.5}$ emissions assumed = PM_{10} emissions.
(b) Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources in Jackson County, Oklahoma. Source: USEPA AIRData; Emissions come from an extract of USEPA's National Emissions Inventory (NEI). Data for year 2002 were extracted from the NEI final version August 2008. NEI is an emissions database developed by USEPA, 2002 is the latest year of emissions available. http://www.epa.gov/air/data/geosel.html.

4.3.4.4 Measures to Reduce Impacts

Little impact to local air quality would be expected from the proposed and alternative actions associated with facility construction, renovation, demolition and associated activities at Altus AFB. Therefore, no mitigative actions would be required. BMPs would include watering the disturbed area of the construction, covering dirt and aggregate trucks and/or piles, prevention of dirt carryover to paved roads, and the use of erosion barriers and wind breaks.

4.3.5 Earth Resources

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of the Proposed Action and alternatives on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development.

Analysis of potential impacts on geological resources typically includes:

- Identification and description of resources that could potentially be affected,

- Examination of the Proposed Action and alternatives and the potential effects they may have on the resource, and
- Provision of mitigation measures in the event that potentially adverse impacts are identified.

Effects on geology and soils could be significant if they alter the lithology, stratigraphy, and geological structures or change the soil composition, structure, or function within the environment.

4.3.5.1 Proposed Action

Under the Proposed Action, construction and demolition activities, such as removal, grading, excavating, and recontouring of the soil, would result in soil disturbance. The soils in the vicinity of the proposed construction projects at Altus AFB have been altered over time, and the project areas have been permanently disturbed by existing facilities and paved roads. Impacts would include an increase in soil erosion that would be minimized through the implementation of BMPs to reduce soil loss. As a result of prior disturbance and development in the project areas, the Proposed Action would not be expected to alter the lithology, stratigraphy, or geological structures; or change the soil composition, structure, or function. However, localized changes to surficial soil composition would occur at each site of construction.

4.3.5.2 No-action Alternative

Under the No-action Alternative, earth resources would not change from the baseline conditions described in Section 3.3.5.

4.3.5.3 Potential Development Alternative

Under the PDA, potential impacts would be similar to those described under the Proposed Action; however, construction would occur on approximately 384 acres of land and 93 acres of additional impervious cover would be added to the installation. This would represent development of approximately 75 percent of the developable land on Altus AFB. Under this alternative, projects apart from Proposed Action projects may have the potential to be located in areas of the installation that have not been previously developed. Although this would result in a decreased amount of open space on base, major changes to topography are not expected. While the project areas would experience soil loss due to construction, this soil loss would be reduced through the use of BMPs. As a result of prior disturbance and development in the project areas, the PDA would not be expected to alter the lithology, stratigraphy, or geological structures; or change the soil composition, structure, or function. However, localized changes to surficial soil composition would occur at each site of construction. No impacts to earth resources would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.5.4 Measures to Reduce Impacts

Should the Proposed Action or the PDA be implemented, mitigation measures would not be needed. Proposed construction projects would however, include site-specific sediment and erosion control plans that detail BMPs to prevent soil loss, capture and contain loose soil, and

slow the movement of storm water during heavy rains. Fugitive dust from construction activities would be minimized by watering and soil stockpiling, thereby reducing the total amount of soil lost to wind.

4.3.6 Biological Resources

Impacts to biological resources could be considered significant if species or habitats of concern are adversely affected over relatively large areas of their range or if disturbances reduce population size or distribution. Species or habitats of concern could include both rare, threatened, and endangered species or non-threatened vegetative or wildlife species of specific interest at the installation.

4.3.6.1 Proposed Action

Implementation of the Proposed Action would have minimal effects on the biological resources at Altus AFB. The majority of the Proposed Action would result in developing or modifying facility space on lands defined by the Altus AFB INRMP (USAF 2007c) as developed military areas. Developed military areas are defined as areas that had previously been disturbed and are characterized by landscaped areas in and among buildings, roads and parking areas. Any wildlife such as small mammals and birds inhabiting the developed military areas would be expected to relocate to other vegetated areas on or surrounding the base where there is suitable habitat. As described in Section 3.3.6, there are no listed animal and plant species found on Altus AFB.

Noise from construction activities, increased traffic, and earth moving may temporarily disturb wildlife near the construction areas. This disturbance is expected to be short-term and minor given the existing noise environment adjacent to an active airfield.

Wetlands have high water-resources value for natural moderation of floods, water-quality maintenance, and groundwater recharge, as well as cultural-resources value for open space, natural beauty, scientific study, outdoor recreation and education, and natural resources for fish, wildlife, agriculture and forestry. The Proposed Action provides all practicable measures to minimize harm to wetlands.

The Proposed Action adheres to the management recommendations outlined in the INRMP and no direct or indirect impact on biological resources would be expected to occur as a result of the Proposed Action.

4.3.6.2 No-action Alternative

Implementation of the No-action Alternative would not change the baseline environment for Biological Resources discussed in Section 3.3.6.

4.3.6.3 Potential Development Alternative

This alternative proposes to develop open space that is not considered environmentally sensitive. Development activities would adhere to management recommendations outlined in the INRMP. It should be noted that the intensity of the proposed development under the PDA varies from that

under the Proposed Action and the No-action Alternative. Although, this intensity is significantly greater (i.e., an increase in the amount of acreage disturbed) from the development planned in the Proposed Action, it is expected that the removal of these areas as available habitat would not adversely affect wetlands nor wildlife populations common in these communities, and any animal species inhabiting these areas would be able to relocate to suitable habitat adjacent to these activities. No impacts to biological resources would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.6.4 Measures to Reduce Impacts

As outlined in Altus AFB INRMP, the installation is aggressively taking steps to restore and enhance vegetative communities to their historical state. If the PDA were implemented, these restoration activities would be allowed to continue to grow in order to assure that a suitable and diverse habitat would be created and maintained for displaced wildlife. Additionally, for either the Proposed Action or the PDA, BMPs would be used at construction sites to reduce sediment runoff affecting habitat and species living in receiving waters.

4.3.7 Cultural Resources

Significant impacts to cultural properties could occur if the proposed or alternative actions would adversely affect historic properties. An adverse effect is an undertaking that diminishes the integrity of a property's location, design, setting, materials, workmanship, feeling, or association. An adverse effect can occur through the destruction or alteration of the property, isolation from or alteration of the environment, introduction of intrusive elements (visual, audible, or atmospheric), neglect, and the transfer, lease or sale of the property (Advisory Council on Historic Preservation and GSA Interagency Training Center 1995).

The nature and potential significance of cultural resources in the potentially affected areas were identified by considering the following definition: Historic properties, under 36 CFR Part 800, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP." For the purpose of these regulations this term includes artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the National Register" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP-listing criteria.

4.3.7.1 Archaeological Resources

4.3.7.1.1 Proposed Action

The Proposed Action would construct, demolish, and alter facilities and infrastructure at Altus AFB to improve effectiveness of training, enhance quality of life, replace old, inadequate facilities, and correct current deficiencies. The proposed construction and demolition is within the cantonment area and repairs and replacement would take place along the flight-line and associated taxiways.

The proposed construction and demolition projects in the Proposed Action would have no effect on archeological properties, for previous investigations have indicated that no NRHP-eligible

archeological properties exist within Altus AFB and the probability for archeological deposits is low. Nevertheless, there is always potential for the disturbance of unknown or unrecorded archaeological resources. If any cultural resources are identified during construction, then all ground disturbing activities would cease and a qualified archaeologist and/or SHPO would be notified, as per the Altus AFB Installation Cultural Resources Management Plan.

4.3.7.1.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline conditions as described in Section 3.3.7.2.

4.3.7.1.3 Potential Development Alternative

The PDA represents a broader approach to installation and mission development at Altus AFB. The PDA includes all of the projects addressed within the Proposed Action, as well as projects that would develop 75 percent of developable land on Altus AFB.

The projects and increased aircraft operations associated with the PDA would have no effect on archaeological properties, for previous investigations have indicated that no NRHP-eligible archeological properties exist within Altus AFB. Nevertheless, there is always potential for the disturbance of unknown or unrecorded archaeological resources. If any cultural resources are identified during construction, then all ground disturbing activities would cease and a qualified archaeologist and/or SHPO would be notified, as per the Altus AFB Installation Cultural Resources Management Plan.

4.3.7.2 Historic Resources

4.3.7.2.1 Proposed Action

The Proposed Action would construct, demolish, and alter facilities and infrastructure at Altus AFB to improve effectiveness of training, enhance quality of life, replace old, inadequate facilities, and correct current deficiencies. The proposed construction and demolition is within the cantonment area and repairs and replacement would take place along the flight-line and associated taxiways.

The demolition or alteration of Buildings 82 (Visiting Officer’s Quarters), 130 (Special Operations), 267 (Fire Station), 307 (Open Mess), 415 (Rapcon Center), 426 (Traffic Check House), 444 (Squadron Operations), and 2000 (Traffic Check House) would have no effect as these resources have been evaluated and found to be ineligible for listing on the NRHP. Buildings 156 (Gymnasium), 323 (Shop, Avionics), and 330 (Shop General Purpose) lack historical or architectural significance, and thus, are recommended not eligible for listing on the NRHP. As a result, there would be no effect on these resources. SHPO concurrence would be required prior to demolition of any facilities.

In addition to the 11 buildings to be demolished or altered, landscape features (Clear Zones 17L and 35R, 17L/35R Parallel Runway, Runway 173/353 Assault Strip, taxiways, and the golf course) are to be repaired or replaced. There would be no effect upon these features as they do

not hold historical or architectural significance, and therefore, are not eligible for listing on the NRHP. SHPO concurrence would be required prior to demolition of any facilities.

4.3.7.2.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline conditions as described in Section 3.3.7.3.

4.3.7.2.3 Potential Development Alternative

The PDA represents a broader approach to installation and mission development at Altus AFB. The PDA includes all of the projects addressed within the Proposed Action, as well as projects that would develop 75 percent of developable land on Altus AFB. The additional developable land analyzed under the PDA does not include any buildings that were not analyzed as part of the proposed action. Therefore, development under the PDA would not result in adverse effects on any historic properties. No impacts to historic resources would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.7.3 Measures to Reduce Impacts

Implementation of the proposed or alternative actions would not result in impacts to archaeological or historical resources; therefore, no mitigation measures or BMPs are necessary.

4.3.8 Water Resources

Impacts to surface water and groundwater resulting from the proposed or alternative actions could be significant if project activities resulted in substantial, long-term degradation of surface or groundwater water quality. Impacts could also be significant if construction in flood plains and/or wetlands or increases in impervious cover caused major disturbances in the natural flow, discharge, and recharge of water resources. Water quantity concerns, as applied to municipal water supplies, are discussed in the Utilities and Infrastructure section.

4.3.8.1 Surface Water

4.3.8.1.1 Proposed Action

The actions associated with the Proposed Action that have the potential to impact surface water resources are: demolition activities, shallow excavation, paving, and construction activities. The potential for increased sediment loading of surface water during the initial demolition and construction activities would be the most likely impact associated with the Proposed Action. This potential impact would be short-term and manageable through implementation of a SWPPP along with the incorporation of BMPs for sediment control during construction. Implementation of these actions would minimize potential impacts to water quality.

Six of the individual projects under the Proposed Action, would be expected to disturb over one acre of soil. These include construction of the DASR, RAPCON, ATC training complex; repairing of runways; construction of the consolidated component repair facility; re-grading of clear zones; construction of main gate and construction of the south gate. Each of these projects

would require submission of a Notice of Intent under the General Permit, OKR10, for Storm Water Discharge from Construction Activities Within the State of Oklahoma to the ODEQ, and creation and implementation of a SWPPP (ODEQ 2007).

Based upon Table 2-2, the Proposed Action would result in a total increase of 757,747 SF of impervious cover associated with the proposed construction and demolition projects. This represents an approximate two percent increase in impervious cover (740.84 acres of existing impervious cover) on the installation. This increase of impervious cover would result in an increase of surface water runoff entering the storm water system by 31.28 cubic feet per second (cfs) creating a total of 1,496.88 cfs. The increased runoff has the potential to increase sediment loads within the water bodies. The increase in sediment loads would be maintained and managed by the proper implementation of the base-wide BMPs and engineering controls as stated in the base-wide SWPPP. No major disturbances in the natural flow, discharge, and recharge of surface water resources would be expected as a result of the Proposed Action.

4.3.8.1.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline conditions described in Section 3.3.8.1.

4.3.8.1.3 Potential Development Alternative

This alternative has the potential to increase the area of impervious cover by 93 acres, caused by increased facility space and associated paved areas. The impervious cover would increase by thirteen percent, based upon the current acreage of impervious cover. The long-term impacts of this increase would be an increase in quantity runoff, thus increasing the sediment load, negatively impacting the quality of the surface water. The increase in impervious cover has the potential to create an increase to 1,651 cfs of overland flow during a two year rain event. This increase in storm water runoff would need to be evenly dispersed throughout the five outfalls, as to ensure that the receiving bodies of water could receive the additional quantities in large amounts. To maintain and manage the increase in surface runoff and sediment load, the base-wide SWPPP would need to be implemented properly.

The short-term impacts of this alternative would be an increase in sediment load within runoff discharging from a construction site. The increase in short-term sediment load would be managed by proper implementation of a site-specific SWPPP drafted for the construction site. No major disturbances in the natural flow, discharge, and recharge of surface water resources would be expected as a result of the PDA.

Under the PDA, upgrades to the storm drain system would be included as part of installation development. Therefore, there would be no impacts to the storm drain system as a result of the PDA. Additionally, no impacts to surface water resources would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.8.1.4 Measures to Reduce Impacts

In accordance with the Energy Independence and Security Act of 2007, all Proposed Action construction projects would include site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of runoff flow.

In order to minimize the potential for increased total suspended solids in downstream surface water bodies, the base-wide SWPPP, and where necessary, construction-site specific SWPPPs would be implemented. To decrease the quantity of surface runoff, rain harvesting devices can be installed around current and newly constructed facilities. No other mitigative actions would be required.

4.3.8.2 Groundwater

4.3.8.2.1 Proposed Action

Implementation of the Proposed Action is not expected to impact the quality of groundwater at Altus AFB or the surrounding area; however due to the shallow depth to groundwater near Stinking Creek, the potential is present. If groundwater were encountered, care would be taken during construction activities to ensure that groundwater resources are protected from contamination. Likewise, in the event groundwater is encountered during any construction or demolition activities, care would be taken during construction activities to ensure that workers are protected from potentially contaminated groundwater. In addition, there is a potential to have an impact on the quantity of groundwater. Groundwater beneath Altus AFB is recharged by local precipitation. With an increase in impervious cover, the area in which the water bearing unit receives recharge would decrease by 15.8 acres but this would represent a negligible change with respect to the overall recharge area of the underlying aquifer.

4.3.8.2.2 No-action Alternative

Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.8.2.

4.3.8.2.3 Potential Development Alternative

Impacts for the PDA would be the same as those described for the Proposed Action, with the exception that the impacts would be greater. The increase in impervious surface would be 93 acres but this would not be expected to substantially decrease the amount of groundwater recharge to the underlying aquifer. No impacts to groundwater resources would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.8.2.4 Measures to Reduce Impacts

To reduce the potential for the decrease in quantity of groundwater as a result of the Proposed Action or the PDA, porous pavement could be utilized along with keeping trees or plants with a deep root system to increase the amount of water infiltrated into the groundwater system.

However, there would be no change to the quality of groundwater resources as a result of the Proposed Action, PDA, or the No-action Alternative; therefore, no mitigative actions would be required for the quality. As previously mentioned, if groundwater is encountered during construction activities, care would be taken to ensure that groundwater resources are protected from contamination.

4.3.8.3 Floodplains

4.3.8.3.1 Proposed Action

Floodplains are present along east and western portions of Altus AFB. The proposed construction activities associated with Runway 17L/35R would technically occur in a floodplain as the existing runway crosses an area that has been delineated as floodplain. During this activity, the existing elevations and floodplain environment would be preserved allowing for no impact to the existing floodplain. Additionally, permits and certifications would need to be obtained and in place prior to activities commencing.

4.3.8.3.2 No-action Alternative

Under the No-action Alternative, there would be no change to the baseline conditions described in Section 3.3.8.3.

4.3.8.3.3 Potential Development Alternative

Impacts for the PDA would be the same as those described for the Proposed Action. The additional construction and demolition activities would not be located within delineated 100-year floodplains. Permits and certifications would need to be in place prior to any activities taking place within these designated areas. No impacts to floodplains would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.8.3.4 Measures to Reduce Impacts

To reduce the potential impact to the floodplains located within Altus AFB, proper planning and implementation must occur prior to any site activities commencing within the floodplain. The planning would include creating engineering controls and procedures that limit the amount of disturbed material and modification to the existing elevations.

4.3.9 Hazardous Materials and Wastes

The degree to which proposed construction and demolition activities could affect the existing environmental management practices was considered in evaluating potential impacts to hazardous materials and wastes, including ERP sites. Significant Impacts could result if nonhazardous regulated or hazardous substances were collected, stored and/or disposed of improperly or if the volume of waste material exceeded the current management capacity of the installation.

4.3.9.1 Proposed Action

4.3.9.1.1 Hazardous Materials

The use of hazardous materials during the implementation of the Proposed Action is expected to be limited to construction vehicle maintenance (fuel, oils, and lubricants) activities, construction materials (adhesives, sealants, etc.), and additional aircraft maintenance activities (fuel, oils, lubricants, corrosion removers, and paint). These materials would be required to be properly contained, manifested, and managed in accordance with all federal, state, and local regulations, AFIs, and DoD Directives. Authorization from Altus AFB Hazardous Materials Pharmacy would need to be acquired prior to use of hazardous materials. Under the Proposed Action, no hazardous materials would be collected, stored and/or disposed of improperly and the volume of hazardous materials would not be expected to exceed the current management capacity of the installation.

4.3.9.1.1.1 Asbestos

ACM is potentially present in all buildings. The guidelines present in the *Altus AFB Asbestos Management Plan* would be followed to abate all ACM from the affected facilities prior to demolition activities. A positive long-term positive impact would occur, due to renovation activities removing ACM currently present. No ACM would be used in the construction of any new facilities.

4.3.9.1.1.2 Lead-Based Paint

LBP must be considered to be present in all facilities constructed prior to 1980. Procedures stated in the *Altus AFB LBP Management Plan* would be followed to properly test and manage facilities that have been found to contain LBP. Prior to disturbing any painted surface by renovation or demolishing any facility, 97 CES/CEV must review the project to determine the presence of LBP, if the presence of LBP would affect the project, and if abatement is required. Additionally, LBP may be present within the soils surrounding the facilities. If it is necessary to remove soils for off-site disposal, a limited number of random samples would be collected to assess the presence or absence of lead in soil, and to properly categorize the soil for hazardous constituents per applicable state and federal regulations for disposal offsite. Long-term impacts resulting from this alternative would be positive in the removing of LBP and LBP-contaminated soils.

New personnel and associated family members would need to be informed of the potential presence of LBP within current MFH located at Altus AFB prior to their residency.

4.3.9.1.1.3 Pesticides

Currently, Altus AFB pest management applies commercially available pesticides. Base records indicate the historical application of several pesticides that are no longer approved for use. Although these pesticides were used in accordance with manufacturers' guidance and directions, the potential exists for residual concentrations in the soil underlying on-base facilities. If it is necessary to remove soils for off-site disposal, a limited number of random samples would be

collected to assess the presence or absence of pesticides in soil, and to properly categorize the soil for hazardous constituents per applicable state and federal regulations for disposal off site. Long-term impacts resulting from the Proposed Action would be positive in the removing of pesticide contaminated soils, if contaminated soils are found.

4.3.9.1.2 Hazardous Waste

During demolition activities, associated with the Proposed Action, any ACM- and LBP-containing materials removed would be managed in accordance with established installation management plans and state and federal regulations. LBP-containing materials removed during renovation and demolition of facilities would qualify for household hazardous waste exemption and would be treated as C&D wastes, per the Lead Paint Rule, 40 CFR 257 and the Toxic Substances Control Act. The citations note that LBP-containing material in which any component, fixture, or portion of building that has been coated with LBP; or any solid material coated wholly or partly with LBP resulting from demolition activities can be treated as C&D waste. As described in Section 4.3.9.1.1.2, a limited number of soil samples should be collected to ascertain the presence or absence of pesticides and lead so that any excess soil may be disposed of in accordance with applicable state and federal regulations. Under the Proposed Action, no pesticide-containing soils, ACM, or LBP-containing materials would be collected, stored and/or disposed of improperly. If pesticide-containing soils were removed for off-site disposal, the volume of soil would not be expected to exceed the current management capacity of the installation. No negative short- or long-term impacts resulting from this alternative were identified. Positive impacts would include the proper disposal of abated LBP, ACM, and LBP and/or pesticide contaminated soils decreasing potential human contact with those materials.

4.3.9.1.3 Environmental Restoration Program

As described in Section 3.3.9.3, there are eight ERP sites located within one-half mile of proposed demolition and construction activities. Of these eight ERP sites, two are undergoing remediation activities, four are undergoing long-term monitoring, and two are awaiting a record of decision. Since the ERP sites involve groundwater contamination, it is unlikely that construction activities under the Proposed Action would encounter the contaminated media. However, there is a potential for an individual to encounter contaminated groundwater within a tributary of Stinking Creek, from SS017. If the groundwater is encountered, during construction activities related to the Proposed Action, care would be taken during construction activities to ensure that groundwater resources and human health are protected from potentially contaminated groundwater. Under the Proposed Action, no contaminated groundwater would be collected, stored and/or disposed of improperly. If contaminated groundwater were encountered, the volume of groundwater encountered would not be expected to exceed the current management capacity of the installation.

4.3.9.1.4 Military Munitions Response Program

There is one MMRP site located with Altus AFB, but it is not located within a one-half mile of proposed demolition and construction activities. The Proposed Action would not have an impact on the site.

4.3.9.2 No-action Alternative

Under the No-action Alternative, there would be no change in the baseline conditions described in Section 3.3.9.

4.3.9.3 Potential Development Alternative

Under the PDA, the impacts would be the same as those described for Proposed Action, except that construction and operations of additional aircraft maintenance and industrial facilities, would result in an increase in the hazardous waste stream. Increased aircraft maintenance includes those resulting from construction of the facilities as well as from an increase in aircraft operations. Also, under the PDA, exact locations of proposed construction sites are unknown; however, ERP sites would be excluded from the areas subject to development. No impacts to hazardous materials and wastes would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.9.4 Measures to Reduce Impacts

Impacts with regard to hazardous materials and wastes would not be expected from the proposed activities. All hazardous materials and wastes would be managed according to established plans and state and federal regulations. Therefore, no mitigative actions would be required.

Impacts with regard to the ERP sites would not be expected from the proposed activities. As noted above, in the unlikely event groundwater was encountered, care would be taken during demolition and construction activities to ensure that groundwater resources are protected from contamination. Likewise, in the event groundwater is encountered during new construction, care would be taken during construction activities to ensure that workers are protected from contaminated groundwater.

4.3.10 Safety

Impacts to the safety of personnel, residents, and visitors could be considered significant if the proposed or alternative actions resulted in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

4.3.10.1 Proposed Action

Ground and Traffic Safety. Changes to daily base activities and vehicular operations, including the addition of construction personnel on base, additional vehicles entering and exiting the base for construction operations, and the addition of heavy machinery/construction equipment to the base would result in a short-term increase in the potential for more accidents to occur. Furthermore, construction and demolition activities may require pedestrian and traffic detours. Effective communication to installation personnel regarding changes to traffic activities and unsafe areas would be necessary in order to minimize day-to-day pedestrian and traffic hazards such that they would not result in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

Construction Safety. A short-term increase in the potential for construction-related accidents would be expected due to the temporary increase in construction and demolition activities on the installation. Construction and demolition contractors would be required to establish and maintain safety programs that would provide protection to their workers and limit the exposure of base personnel to construction and demolition hazards such that they would not result in a substantial increase in the potential for death, serious bodily injury or illness, or property damage.

4.3.10.2 No-action Alternative

Under the No-action Alternative, conditions would remain at the baseline condition described in Section 3.3.10. No impacts to safety at Altus AFB would be expected.

4.3.10.3 Potential Development Alternative

Ground and Traffic Safety. The potential for activity on undeveloped land would occur on Altus AFB property. Changes in daily on-base activities due to construction would result in a short-term increase in the potential for more accidents to occur. As with the Proposed Action, effective communication to installation personnel regarding changes to traffic activities and unsafe areas would be necessary in order to minimize day-to-day pedestrian and traffic hazards such that they would not result in a substantial increase in the potential for death, serious bodily injury or illness, or property damage. No impacts to safety would be expected as a result of the increase in aircraft operations associated with the PDA.

Construction Safety. Short-term increases in construction-related accidents would be comparable to those under the Proposed Action due to the increased construction activities.

4.3.10.4 Measures to Reduce Impacts

Mitigation measures would not be needed under the Proposed Action or alternative actions. Construction contractors would be required to develop and implement safety plans for each construction project.

4.3.11 Infrastructure and Utilities

The following factors were considered in evaluating potential impacts to infrastructure and utilities: (1) the degree to which a utility service would have to alter operating practices and personnel requirements; (2) the degree to which the change in demands from implementation of the proposed or alternative actions would impact the utility system’s capacity; (3) the degree to which a transportation system would have to alter operating practices and personnel requirements to support the action; and (4) the degree to which the increased demands from the proposed program would reduce the reliability of transportation systems. Impacts to utilities would be considered significant if implementation of the proposed or alternative actions resulted in a change in demand which exceeded the capacity of the utility providers. Impacts to transportation systems could be considered significant if implementation of the proposed or alternative actions resulted in a substantial decrease in the level of service provided by transportation systems.

To determine the effective population associated with each alternative, Altus AFB personnel who live off-base are weighted by a factor of one-third to represent their average eight-hour per day demand on installation utilities. By calculation, Altus AFB currently has an effective population of 3,167 (Table 3-10). Under the Proposed Action and No-action Alternative, this effective population would remain constant, as no additional personnel would be assigned to the installation. Under the PDA, an additional 426 personnel and dependents would be added to the installation, with all of them living on base. As a result, the effective population under the PDA would be 3,593 (Table 4-11).

Table 4-11 Altus AFB Effective Population Under the PDA

Category	Population	Effective Population Factor	Effective Population
PDA On-base Personnel (24-hr population)	2,519	1.00	2,519
PDA Off-base Personnel[a] (8-hr population)	3,254	0.33	1,074
Total	**5,773**	**--**	**3,593**

Notes:
[a] From Table 3-10
hr – hour

To determine the per capita usage of a utility, the historical data is reviewed (i.e., annual usage of potable water) and then divided by the effective population. The number generated is the annual per capita usage of that utility. When utilizing an effective population to determine utility usage statistics, it must be noted that the historical usage numbers include all domestic, industrial, commercial, and public use. Including these types of usages creates a higher value and does not represent an actual "per person" consumption rate for the installation.

4.3.11.1 Potable Water

4.3.11.1.1 Proposed Action

There would be no increase in additional personnel or dependents, and therefore, no additional per capita increase in potable water usage as a result of the Proposed Action. Additionally, there would be no mission change that would require additional potable water usage. Demolition and construction of facilities, as described in Section 2.3.2, have the potential to result in an increase in potable water consumption as a result of dust suppression activities and facility related usage. However, this increase cannot be quantified and would be both short- and long-term.

The short-term increase would be due to dust suppression activities. Long-term increase in potable water usage would potentially be from installation of air conditioning systems, landscaping of new turf areas and ornamental landscaping, and installation of other water utilizing devices associated with new facilities. There is currently sufficient potable water capacity at the City of Altus to accommodate this increase in potable water consumption.

The potable water distribution system appears to be in good condition; however, moderate updating/construction to the system and to storage tanks may be required to ensure future use and capability (USAF 2003).

4.3.11.1.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.11.1.

4.3.11.1.2 Potential Development Alternative

Impacts for the PDA would include an increase of 426 personnel and dependents, and an increase of 695,538 SF of new facilities. These activities would result in a short and long-term increase in potable water consumption.

The increase of 426 personnel and dependents would result in a long-term increase in potable water consumption at Altus AFB. Based upon the incoming population, there would be an increase in potable water usage by approximately 55,167 gpd, or 13.4 percent. The additional construction would increase both the short-term and long-term potable water usage. The short-term increase in potable water usage would be the result of dust suppression activities. The long-term impacts would be the result of increased square footage creating an increase in landscaping of new turf areas and ornamental landscaping and installation of other water utilizing devices associated with new facilities. The new total potable water usage would still remain within the capacity of the City of Altus' water allotment.

The potable water distribution system appears to be in good condition; however, moderate updating/construction to the system and to storage tanks may be required to ensure future use and capability (USAF 2003). No impacts to potable water would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.11.2 Sanitary Sewer

4.3.11.2.1 Proposed Action

There would be no increase in additional personnel or dependents, and therefore, no additional per capita increase in wastewater generation. Construction of facilities, as described in Section 2.3.2, would have the potential to result in an increase in potable water consumption as a result of facility-related usage, creating an increase in wastewater generation (i.e., bathroom facilities and break rooms). Although this increase cannot be quantified, the City of Altus WWTP currently operates at less than 60 percent of its capacity (USAF 2008c). This leaves sufficient remaining capacity to allow for additional installation development under the Proposed Action.

4.3.11.2.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.11.2.

4.3.11.2.2 Potential Development Alternative

Impacts for the PDA would include an increase of 426 personnel and dependents and an increase of 695,538 SF of facility space. These activities would result in a long-term increase in wastewater generation. Based upon the incoming population, there would be a long-term annual increase of approximately 53,676 gpd, or 13 percent of wastewater generated. As with the Proposed Action, construction of new facilities would have the potential to result in an increase in potable water consumption as a result of facility related usage, creating an increase in wastewater generation. Although this increase cannot be quantified, the City of Altus WWTP currently operates at 60 percent of its capacity (USAF 2008c). The new total wastewater generation would still remain within the capacity of the WWTP. No impacts to sanitary sewer would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.11.3 Solid Waste

The degree to which the proposed construction, demolition, and renovation activities could affect the existing solid waste management program is the overall factor when determining potential impacts. The solid waste generated during construction, demolition, and renovation activities would consist of materials such as solid pieces of concrete and asphalt, metals, and lumber. The contractor would be responsible for disposing of solid waste in accordance with all federal, state, and local laws. A significant impact could occur to solid waste management systems if the amount of solid waste generated from the Proposed Action or PDA exceeded the capacity of the City of Altus Landfill.

4.3.11.3.1 Proposed Action

Under the Proposed Action there would be no mission change. Construction, renovation, and demolition activities associated with the Proposed Action would result in a short-term increase in solid waste generated at Altus AFB. It is assumed that generation of solid waste would be spread out over each year of construction and that larger projects would occur over several years. Table 4-12 shows the estimated construction and demolition waste that would be generated as a result of construction and demolition activities associated with the Proposed Action for each year of construction.

Table 4-12 Solid Waste Generation from Construction and Demolition Activities Associated with the Proposed Action

Fiscal Year of Project	Project Type	Area Affected (SF)	Rate of Debris (lb/SF) [(a)]	Estimated Solid Waste Generated from Action (Tons)	Total Waste Generated Each Year
2010	Construction [(b)]	1,377,374	3.89	2,679	2,679
2011	Demolition	74,541	155	5,777	6,007
2011	Construction	118,154	3.89	230	
2012	Demolition	1,076	155	83	68,636
2012	Construction	35,245,976	3.89	68,553	
2014	Construction	326,250	3.89	635	845
2014	Renovation	17,470	24.05	210	
2015	Demolition	44,000	155	3,410	6,214
2015	Construction	1,441,500	3.89	2,804	
				Total	**84,381**

Notes:
SF = square feet lb/SF = pounds per square foot
(a) USEPA 1998. As reported in the *Characterization of Building-Related Construction and Demolition Debris in the United States,* estimated non-residential construction debris rates are 3.89 lbs/SF. Construction projects include facility construction, as well as construction of additional pavement, which is assumed to generate a negligible amount of solid waste. Non-residential demolition rates are estimated to be 155 lbs/SF. Demolition debris rates include removal of concrete slab, pavements, and roadways. Non-residential renovation debris rates were unavailable; however, the *Characterization of Building-Related Construction and Demolition Debris in the United States* provides that, based on the assumption that for non-residential renovation, waste generation per dollar is equal to the residential rate, total non-residential renovation is less than the residential generation by the ratio of dollars spent. Therefore, for purposes of this analysis, the rate of debris generated for residential renovation (24.05 lbs/SF) was used for non-residential renovation.
(b) Construction projects include additional infrastructure identified in Table 2-2, as it is assumed that the amount of solid waste generated from additional infrastructure would be minimal. Construction projects also include asphalt clearing and repaving activities due to the minimal amount of solid waste generated that is not recyclable.

Based on the estimated rates indicated in Table 4-12, approximately 84,381 tons of construction, demolition, and renovation waste would be generated over the six-year period of the Proposed Action, with the majority occurring in 2012. Assuming an average recycling and reuse diversion rate of 58 percent for construction materials (USAF 2009) and a rate of 90 percent for asphalt materials (Harrington 2008), it is anticipated that only 12,363 tons of construction, demolition, and renovation waste would be disposed at the City of Altus Landfill over the life of the project. Annually, the Proposed Action would result in an average increase of 2,061 tons of waste disposed at the City of Altus Landfill. The City of Altus Landfill currently receives approximately 36,104 tons of solid waste per year. The Proposed Action would result in an increase of approximately 5.7 percent in the amount of waste disposed at the city landfill annually. Since the City of Altus Landfill has approximately 395 acres of remaining available land, there would be sufficient capacity to handle the short-term increase in solid waste.

4.3.11.3.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.11.3.

4.3.11.3.2 Potential Development Alternative

The CIP projects would be incorporated into the PDA as discussed in Section 2.5.1.2. Beyond the Proposed Action projects, broad installation expansion would result in approximately 459,804 SF of construction, totaling 894 tons of solid waste. This would result in a total of approximately 85,275 tons of solid waste generated from the PDA (Table 4-13). Considering recycling diversion rates, the construction waste generated from the renovation, demolition, and construction activities associated with the CIP projects would be approximately 12,363 tons and the waste generation associated with broad installation development would be approximately 375 tons, resulting in a total solid waste generation of 12,738 tons. Annually, the PDA would result in an average increase of 2,123 tons of waste disposed at the City of Altus Landfill. The City of Altus Landfill currently receives approximately 36,104 tons of solid waste per year. The PDA would result in an increase of approximately 5.9 percent in the amount of waste disposed at the city landfill annually.

Table 4-13 Estimated Renovation, Demolition, and Construction Associated with the PDA

	Renovation (SF)	Demolition (SF)	Construction (SF)	Total Solid Waste (Tons) [a]
Proposed Action Projects	17,470	119,617	38,509,254	84,381
Broad Installation Expansion	--	--	459,804	894
Total	**17,470**	**119,617**	**38,969,058**	**85,275**

Notes:
PDA = Potential Development Alternative
SF = square feet
[a]-USEPA 1998. Estimated non-residential construction debris rates, as reported in the *Characterization of Building-Related Construction and Demolition Debris in the United States*, are 3.89 lbs/SF, and non-residential demolition rates are estimated to be 155 lbs/SF. Demolition debris rate include concrete slabs. Non-residential renovation debris rates were unavailable; however, the *Characterization of Building-Related Construction and Demolition Debris in the United States* provides that, based on the assumption that for non-residential renovation, waste generation per dollar is equal to the residential rate, total non-residential renovation is less than the residential generation by the ratio of dollars spent. Therefore, for purposes of this analysis, the rate of debris generated for residential renovation (24.05 lbs/SF) was used for non-residential renovation.

As a result of an additional 426 personnel and dependents at Altus AFB, there would also be a long-term increase in administrative solid waste generated at newly constructed facilities, as well as a long-term increase in municipal solid waste generated in the local area. Based on the population increase and the current per capita rate of municipal solid waste generation, it is estimated that an additional 79 tons of municipal solid waste would be generated annually as a result of the PDA. This would be a 13 percent increase in municipal solid waste generation at the installation.

By combining municipal solid waste and construction waste generated as a result of the PDA, the annual increase in the amount of waste disposed of at the City of Altus Landfill would be approximately 2,202 tons, or six percent. Since the City of Altus Landfill has approximately 395 acres of remaining available land, there would be sufficient capacity to handle the short-term increase in solid waste. No impacts to solid waste would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.11.4 Drainage

4.3.11.4.1 Proposed Action

As discussed in Section 2.3.2 the Proposed Action would have the potential to increase impervious cover by 17.4 acres. This is a 2.3 percent increase over current conditions. This increase in impervious cover would be expected to result in a two percent or 18.8 cfs increase in storm water runoff (U.S. Department of Commerce 1961 and LMNO 2009). As part of the project planning activities, localized drainage improvements would be considered and incorporated into the planning process. The base-wide drainage system with its five drainage points is sufficient to accommodate the potential increase in storm water runoff.

4.3.11.4.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.11.4.

4.3.11.4.2 Potential Development Alternative

The PDA would have the potential to increase impervious cover by approximately 93 acres. This increase in impervious cover would be expected to result in a 12.5 percent or 100.4 cfs increase in storm water runoff (U.S. Department of Commerce 1961 and LMNO 2009). As part of the project planning activities, localized drainage and infrastructure improvements (i.e. oil water separators, added retention ponds, lift stations, increased pipe size) would be considered and incorporated into the planning process for each project. Since upgrades to the existing storm drain system would be included under broad installation development for this alternative, the storm drain system would be able to handle any additional capacity required from installation development. Therefore, there would be no impact to the storm drain system as a result of the PDA. Additionally, no impacts to drainage would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.11.5 Transportation

4.3.11.5.1 Proposed Action

There would be an intermittent, short-term increase in traffic counts associated with a variety of tradespersons entering the installation on a daily basis to accomplish construction and demolition activities. Increased traffic counts would be expected in the early morning as workers arrive at their job site and in the early evening as workers depart for the day. This would typically coincide with the normal commuting patterns of Altus AFB.

Transportation of heavy equipment, materials, and roll-off dumpsters to and from the construction locations would add additional short-term traffic on the installation and on public roads that connect to the installation. The heavy loads that would be expected from this type of traffic could affect road surface conditions if the roadway section is not adequate to support continued heavy equipment traffic for an extended period. Repair of small roadway sections may be required following completion of the construction projects.

4.3.11.5.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.11.5.

4.3.11.5.2 Potential Development Alternative

Impacts related to construction activities would be the same as for the Proposed Action, except that the PDA would include an increase in the transportation as a result of an increase in 426 personnel and dependents, and an increase in construction activities. The increased traffic related to personnel would be long-term. Additionally, personnel and dependents residing on the installation would increase on-base traffic and parking requirements. It is anticipated that these requirements would be met by the general installation development under the PDA. No impacts to transportation would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.11.6 Electricity and Natural Gas

4.3.11.6.1 Proposed Action

There would be no increase in additional personnel or dependents, and therefore, no additional per capita increase in electricity or natural gas usage as a result of the Proposed Action. Construction of new facilities, as described in Section 2.3.2, would have the potential to increase energy consumption as a result of facility related usages. Although this increase cannot be quantified, this long-term increase in energy usage would result from use of heating, ventilation, and air conditioning systems; lighting; computers; and additional energy-consuming devices associated with the new facilities. As stated in Section 3.3.11.6, Western Farmers Electric Cooperative and the natural gas supply system have sufficient capacity to meet the current and projected electricity and natural gas demands of Altus AFB (USAF 2005c). In the event that natural gas demand exceeded capacity of the supply system, localized supply system upgrades would be considered and incorporated into the planning process.

4.3.11.6.1 No-action Alternative

Under the No-action alternative, there would be no change to the baseline conditions described in Section 3.3.11.6.

4.3.11.6.2 Potential Development Alternative

Impacts for the PDA would include an increase of 426 personnel and dependents as well as an increase of 695,538 SF of new facilities. These activities would result in a long-term increase in electrical and natural gas consumption.

Based on the population increase (426 people), there would be an annual long-term increase of approximately 7,774.5 MWh of electricity or an increase of 12 percent, and a natural gas consumption increase of 26,071 kcf or an increase of 13 percent. The total annual electricity usage for Altus AFB would be approximately 71,143 MWh and the total natural gas usage would be 219,983 kcf. The additional construction would also increase long-term electrical usage and,

although this increase cannot be quantified, the per capita rates associated with incoming personnel account for some of the additional energy required to power HVAC, lighting, computers, and additional energy using devices associated within the additional facilities (see explanation of per capita rates in Section 4.3.11). As stated in Section 3.3.11.6, Western Farmers Electric Cooperative and the natural gas supply system have sufficient capacity to meet the current and projected electricity and natural gas demands of Altus AFB (USAF 2005c). In the event that natural gas demand exceeded capacity of the supply system, localized supply system upgrades would be considered and incorporated into the planning process. No impacts to electricity or natural gas would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.11.7 Measures to Reduce Impacts

All utility providers and utility systems at Altus AFB have sufficient capacity to accommodate an increase in consumption or generation associated with the Proposed Action, PDA, and the No-action Alternative. Therefore, no measures are necessary to reduce impacts. BMPs such as implementation of water and energy saving devices in new facilities and recycling of construction, demolition, and renovation wastes would help to offset utility consumption and solid waste generation.

4.3.12 Socioeconomic Resources

The analysis for socioeconomic resources is based on the following criteria:

Population. The degree to which changes in the population of Altus AFB personnel or in the surrounding community would place pressures on community services, transportation, or infrastructure in that community;

Housing. The degree to which an influx of people and construction in the local community would affect available and suitable housing, or a large amount of housing development, in that community;

Education. The ability of the local school system to absorb an influx of students over a short period of time, and continue to provide a suitable education to these children; and

Economy. The degree to which a change in the local population and activities would affect employment rates, job availability, and either a gain or loss of business exchange in the local community.

Impacts would be considered significant if there was in increase in population such that:

- community services, transportation, or infrastructure could not be expanded to meet the needs of the expanded population,
- sufficient housing could not be constructed to accommodate the incoming population,
- existing schools were not available to absorb an influx of students and sufficient additional schools could not be constructed to accommodate those students, or

- long-term employment rates decreased, the amount of local business decreased, or the increase in population exceeded the projected growth rate for the statistical area.

4.3.12.1 Proposed Action

Population. Under the Proposed Action, no new personnel would be assigned to Altus AFB and there would be no change to the total population of Altus AFB as a result of the Proposed Action. However, it is assumed that there would be contractors flowing on and off base due to the presence of construction activities. This would result in a short-term fluctuation in the population of the local community.

Housing. Because no changes in personnel levels would occur, and because demolition/renovation would not be occurring in currently occupied MFH units or dormitories, there would be no negative effects to housing under the Proposed Action. Privatization of MFH units at Altus AFB is expected to reduce the inventory from 770 units to 726 units and will be completed by 2010.

Education. No new personnel would be assigned to Altus AFB; therefore, there would be no change in area school populations under the Proposed Action.

Economy. Under the Proposed Action, any construction, renovation, and demolition of facilities would begin in 2010 and would be completed by 2015. Expenditures incurred during construction and demolition would flow into the local economy. Also, the addition of contractor and construction individuals to the local community would result in increased economic activity. Table 2-2 indicates when each project is projected to begin and for purposes of analysis, it is anticipated that larger projects would occur over several years. Due to this schedule, economic impacts associated with construction would be expected to vary as the construction periods begin and end.

4.3.12.2 No-action Alternative

Population. Under the No-action Alternative, there would be no change to the baseline conditions described in Section 3.3.12.1. Therefore, there would be no impact to population.

Housing. Under the No-action Alternative, there would be no change to baseline conditions described in Section 3.3.12.2. Therefore, there would be no impact to housing.

Education. Under the No-action Alternative, there would be no change to baseline conditions described in Section 3.3.12.3. Therefore, there would be no impact to education.

Economy. Under the No-action Alternative, there would be no change to baseline conditions described in Section 3.3.12.4. Therefore, there would be no impact to economy.

4.3.12.3 Potential Development Alternative

Population. Under the PDA, an additional 426 personnel and dependents would be added to Altus AFB, resulting in a total end state installation population of 5,773 personnel. This would

be an eight percent increase over the current population. Under the PDA, all of the incoming personnel would live on base. It is unknown what amount of personnel would be accompanied or unaccompanied. The projected growth rate for Jackson County from 2005 to 2010 is 3.1 percent, or a 900 person increase (Oklahoma Department of Commerce 2008). The number of personnel and their dependents falls within the projected growth rate for Jackson County and therefore, this increase to local population would not affect the ability of public services, transportation, or infrastructure to effectively support the community. No impacts to population would be expected as a result of the increase in aircraft operations associated with the PDA.

Housing. Under the PDA, an additional 426 personnel and dependents would be added to Altus AFB. All of the incoming personnel and their dependents would live on base. As a result, there would be a long-term increase in accompanied housing and unaccompanied housing requirements on base. The long-term impacts associated with the substantial increase in personnel and dependents would be offset by construction of housing at Altus AFB under the broad installation development component of the PDA. As such, adequate housing on- and off-base would be expected to be available to accommodate the population increase associated with the PDA. No impacts to housing would be expected as a result of the increase in aircraft operations associated with the PDA.

Education. Under the PDA, there would be a long-term increase in area school populations due to the enrollment of dependents in the Altus Public School District. The grade distribution of the additional students is unknown, however, current capacities at the Altus Public School District indicate that all schools in the district could accommodate the additional students. No impacts to education would be expected as a result of the increase in aircraft operations associated with the PDA.

New families assigned to Altus AFB would enroll their children in the Altus Public School District. It is assumed that elementary age students would be enrolled at L. Mendel Rivers Elementary School, located on the installation, and older students would be enrolled at Altus Junior High School and Altus High School. If these schools were to reach capacity, it is assumed the students would attend nearby schools in the same district.

Economy. Expenditures incurred during construction would result in short-term positive impacts to the local economy. Also, the addition of 426 personnel and dependents to the local community would result in a long-term positive impact. No impacts to the economy would be expected as a result of the increase in aircraft operations associated with the PDA.

4.3.12.4 Measures to Reduce Impacts

There are no mitigation measures required as a result of the Proposed Action or the PDA.

4.3.13 Environmental Justice

As discussed in Section 3.3.13, the Air Force has issued guidance on environmental justice analysis as a part of the EIAP. In order to comply with EO 12898, ethnicity and poverty status in the study area have been analyzed. The ROI for each resource area has been evaluated within the COC in order to identify the presence or absence of environmental justice populations. The

ROI for the resources (i.e., air quality, noise, land use) is the area within the boundaries of Altus AFB and the City of Altus. Given that there is no demographic data available for Altus AFB and the fact that there are no minority or low-income populations present at Altus AFB, the City of Altus served as the ROI and its demographic data was used for the analysis. There is an environmental justice population, minority and low-income, present within the area that would be impacted by construction and demolition activities; however, all impacts associated with the Proposed Action and PDA would be evenly distributed across the region of influence. There are no adverse impacts associated with the proposed or alternative actions; therefore, there would be no disproportionately high or adverse impacts to minority or low-income populations.

4.4 CUMULATIVE EFFECTS

Airspace Use and Management

Concurrent actions described in Section 2.6 would not be expected to affect airspace resources so cumulative effects would not be different from those presented in Section 4.3.1.

Noise

The other actions described in Section 2.6 would not adversely affect the natural or man-made environment as a result of increased noise exposure. Construction projects would be of temporary duration and the increase in air traffic would be limited to approximately three sorties per day. In aggregate, their noise impact would not be appreciably different from those projects that are part of the proposed and alternative actions. Although the construction and aircraft noise from projects described in Section 2.6 would extend off the installation, they would not be the major contributor to the noise setting in the area. Therefore, when considering the Proposed Action or the PDA in conjunction with those projects presented in Section 2.6, the effects would be of short duration and would not influence the cumulative noise exposure metric.

Land Use

Projects described in Section 2.6, when considered with the action alternatives, would not adversely affect land use resources. The projects identified would be undertaken in conformance with Air Force regulations and sound planning principles. Their development is presumed consistent with the Altus AFB General Plan and the Altus AFB 2030 Plan and their effect on land use resources is expected to be found to not be significant.

Air Quality

Jackson County is in attainment for all criteria pollutants; therefore cumulative air quality impacts associated with the proposed and alternative actions are not anticipated. The air pollutant emission calculations conservatively used worst-case assumptions. The cumulative impacts from the proposed and alternative actions are expected to have no significant impact when compared to the total emissions for Jackson County, Oklahoma.

The Proposed Action and PDA construction, renovation, and demolition at Altus AFB would result in short-term emissions during construction, renovation (primarily pavement removal),

demolition, and associated infrastructure, principally from site clearing/preparation activities and the use of construction equipment and related vehicles. The emissions would be temporary, localized and would be eliminated after the activity is completed. The short-term increase in emissions is not significant when compared to the total Jackson County annual emissions. The Proposed Action would not involve any changes in facility mission or operations, and there would be little or no increase in the number of personnel employed at the facility. The new facilities will have improved control technology that will likely lower ambient air emissions. Therefore, long-term emissions are not expected to increase. The PDA would involve a 57 percent increase in aircraft operations and an additional 426 personnel, thus moderately increasing long-term annual emissions. The impact of this increase is not significant when compared to the total Jackson County annual emissions.

Concurrent construction projects identified in Section 2.6 would produce short-term air emissions from construction, renovation, and demolition activities. The emissions from construction, renovation, and demolition activities would be localized and short-term in nature. The emissions quickly dissipate away from the activity source, thereby preventing cumulative ambient air impacts.

Earth Resources

The projects discussed in Section 2.6 are similar in scope and scale to those in the Proposed Action and the PDA. The soils in the vicinity of the proposed construction projects on Altus AFB have been altered over time and the project area is disturbed with existing facilities and paved roads. The airpark to be constructed to the east of the installation would be built on an area which is currently farmland. Potential cumulative effects would include an increase in soil disturbance associated with construction activities. The impacts would be minimized by the use of BMPs to minimize soil erosion.

Biological Resources

The proposed and alternative actions would have a minimal impact on the biological resources on Altus AFB since the majority of these activities would occur in developed areas of the installation. Therefore, the Proposed Action and PDA would not be expected to contribute to cumulative adverse impacts from projects described in Section 2.6.

Cultural Resources

Any potential adverse effects to significant archeological resources under the Proposed Action or PDA would be reduced through data recovery; thus, there would be no potential for cumulative impacts. Any potential adverse effects to significant historic resources under the Proposed Action or PDA would be addressed through documentation determined in consultation with the SHPO; thus, there would be no potential for cumulative impacts.

Water Resources

The projects identified in Section 2.6 would create additional impervious cover on and adjacent to Altus AFB. Surface water management would present the main issue of concern regarding

cumulative impacts. In the short term, construction and shallow excavation required during construction activities for the Proposed Action, PDA, and concurrent projects that would occur at and adjacent to Altus AFB would primarily require addressing sediment control and runoff. In the long term, additional surface water runoff would be caused by an increase in impervious surface, associated with installation development and concurrent projects. To ensure that the additional overland flow would not impact Altus AFB, the installation's stormwater system must be maintained and potentially expanded to meet the additional capacity. Additionally, the distribution of the increased surface water should reach receiving waters that have the capacity to absorb the increase in surface water and sediment load. To further minimize the short- and long-term impacts, site specific SWPPPs would be implemented along with the base-wide SWPPP. These plans would assist with decreasing sediment load entering into the increased surface water runoff.

Hazardous Materials and Wastes

The Proposed Action, PDA, and concurrent actions would require the management of ACM, LBP, and ERP sites. For concurrent actions, management of these materials and waste streams would occur under Altus AFB and City of Altus management programs. For the Proposed Action and PDA, management of hazardous materials and wastes would occur under Altus AFB management programs. The proposed and alternative actions would not contribute to cumulative effects to hazardous materials and wastes, as no additional hazardous materials or waste would be expected to be created on the installation. Additionally, the Proposed Action and PDA would not generate hazardous materials or wastes outside of the installation and would therefore not contribute to cumulative impacts to hazardous materials and wastes in the City of Altus.

Safety

Implementation of the Proposed Action or PDA, and the other concurrent actions would slightly increase the short-term risk associated with the construction contractors performing work at these locations. Contractors would be required to establish and maintain safety programs that would provide protection for their workers and limit the exposure of base personnel to construction hazards.

Utilities and Infrastructure

None of the other projects scheduled to occur during the same time as the Proposed Action or PDA would contribute to a change in population. Therefore, these concurrent projects would not contribute to an overall per capita increase in potable water consumption, sanitary waste generation, electrical, and natural gas consumption resulting from the Proposed Action and PDA. However, the creation of additional square footage as a result of the other projects would increase potable water consumption, sanitary waste generation, electrical, and natural gas consumption. The increase in facility usage is not quantifiable; however, none of the utility systems at Altus AFB are currently constrained. Therefore, it is not anticipated that an increase in utilities consumption/generation would impact the system's capacity.

The additional projects would also increase solid waste generation and would contribute to the temporary short-term increase in traffic resulting from construction, renovation, and demolition

activities. The increase in traffic would be due to transportation of heavy equipment, materials, and roll-off dumpsters to and from the construction locations. This would increase the deterioration of roadways already projected from the Proposed Action and PDA. Additional impervious cover constructed as a result of the concurrent actions would contribute to an increase in stormwater runoff resulting from the Proposed Action and PDA. The concurrent actions described in Section 2.6 would result in an increase in solid waste over the life of those projects. Since the City of Altus Landfill has approximately 395 acres of remaining available land, there would be sufficient capacity to handle the short-term increase in solid waste.

Socioeconomics Resources

No projects scheduled to occur at the same time as the Proposed Action or PDA would contribute to a change in population, housing, or education. Therefore, these concurrent projects would not contribute to the overall increases to population, housing, and education requirements resulting from the Proposed Action and PDA.

Environmental Justice

There is an environmental justice population present at Altus AFB; however, there are no adverse impacts associated with the proposed or alternative actions. Therefore, the Proposed Action and PDA would not contribute to cumulative impacts to Environmental Justice communities.

Chapter 5

List of Preparers

CHAPTER 5
LIST OF PREPARERS

Name/Organization	Degree	Resource Area	Years of Experience
Carlton Hendrix/WESTON	BS, Environmental Engineering; MS, Civil Engineering	Project Manager	10
Robin Divine/WESTON	BS, Geography; MAG, Geography and Environmental Management and Planning	Interim Project Manager	18
Tamara Carroll/WESTON	BS, Bioenvironmental Science	Resource Lead, Utilities and Infrastructure, Document Compilation	7
Elisa Morales/WESTON	BS, Biology	Resource Lead, Earth Resources, Safety, Socioeconomics, Environmental Justice,	6
Barry Peterson/WESTON	BS, Meteorology; MS, Atmospheric Sciences	Resource Specialist, Air Quality	8
Kevin Eldridge/WESTON	BS, Meteorology; MS Atmospheric Sciences	Resource Lead, Air Quality	23
Jennifer Peters/WESTON	BS, Geography	Resource Lead, Hazardous Materials and Wastes, Water Resources	7
Duane Peter/Geo-Marine, Inc.	BA, History; MA, Anthropology	Resource Lead, Cultural Resources (Archaeological Resources)	34
Marsha Prior/Geo-Marine, Inc.	BA, Sociology; MA, Anthropology; PhD, Anthropology	Resource Lead, Cultural Resources (Historic Resources)	18
John R. Ouellette/Geo-Marine, Inc.	BS, Biology; MS, Entomology	Resource Lead, Biological Resources	17
Darrell Pennington/Geo-Marine Inc.	BS, Professional Aeronautics	Resource Specialist, Airspace Use and Management, Noise	20
Kurt Hellauer/Geo-Marine, Inc.	BA, Government	Resource Lead, Airspace Use and Management, Noise	18

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Chapter 6

List of Persons and Agencies Consulted

CHAPTER 6
LIST OF PERSONS AND AGENCIES CONSULTED

Federal Agencies

Altus Air Force Base
James Bellon, Civil Engineering
Felicia Siens, Altus AFB Housing Program Manager

Federal Highway Administration
Jason Harrington, Recycling Technology Engineer

U.S. Army Corps of Engineers

U.S. Bureau of Indian Affairs
Jeanette Hannah, Muskogee Area Director

U.S. Department of Agriculture
Ron Hillard, State Conservationist

U.S. Department of Fish and Wildlife

U.S. Environmental Protection Agency

Schools

Altus High School
Mark Haught, Principal

Altus Junior High School
Roe Worbes, Principal

L. Mendel Rivers Elementary School
Robbie Holder, Principal
Jenifer Wollenzin, Aide

Oklahoma State Agencies

Oklahoma Department of Environmental Quality
Margaret Graham

Oklahoma Department of Wildlife Conservation

Oklahoma Natural Heritage Inventory

State Historic Preservation Office

Melvina Heisch, Deputy State Historic Preservation Officer

Tribal Agencies

Apache Tribe of Oklahoma
Donna Prengiss, Director

Cherokee Nation, Oklahoma
Chad "Corntassle" Smith, Principal Chief

Caddo Indian Nation of Oklahoma
Polly Edwards, Environmental Director

Chickasaw Nation
Bill Anoatubby, Governor

Comanche Nation
Wallace Coffey, Tribal Chairman

Other Agencies and Individuals

Board of County Commissioners

City of Altus
City Council
Kenny Combs, City of Altus Sanitation Superintendent
Honorable T.L. Gramling, Mayor
Michael Nettles, Altus City Administrator

Military Affairs Committee
Dr. Joe Leverett, President

Chapter 7

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CHAPTER 7
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Appendix A

Interagency/Intergovernmental Coordination and Public Participation

General Scoping Letter Example

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DEPARTMENT OF THE AIR FORCE
97th AIR MOBILITY WING
ALTUS AIR FORCE BASE OKLAHOMA

6 Mar 09

Charles R. Butchee
Chief, Asset Management Flight
97th Civil Engineer Squadron
401 L Avenue
Altus AFB, OK 73523

Ms. Jeanette Hannah,
Muskogee Area Director
US Bureau of Indian Affairs
Muskogee Area Office
3100 W. Peak Blvd.
Muskogee, OK 74401

Dear Ms. Hannah,

The 97th Civil Engineer Squadron at Altus Air Force Base (AFB), Oklahoma, is preparing an Environmental Assessment (EA) under the National Environmental Policy Act. We propose actions to accommodate the development of the installation based upon the Capital Improvements Program in our installation General Plan. The General Plan requirements define the plan for potential facilities and associated site improvements in support of the existing missions at Altus AFB. These projects would improve the effectiveness of training, enhance quality of life, replace old inadequate facilities, correct current deficiencies, and accommodate new mission activities.

Three alternatives will be considered including the Proposed Action, the Potential Development Alternative, and the alternative to take no action. The Proposed Action includes:

- Demolition of all or part of 10 buildings totaling 136,117 square feet.
- Renovation of one facility, two runways, and the clear zones at runway 17L/35R, totaling 36,248,470 square feet.
- New construction totaling 235,734 square feet.
- Establishing a closed traffic pattern on the west side of Altus AFB as a part of regular flight operations. There would be no new aircraft or operations associated with this new traffic pattern.

The Potential Development Alternative represents a broader approach to development at Altus AFB. The Potential Development Alternative would include all projects contained in the Proposed Action, as well as additional projects that could be built on undeveloped land on the installation.

We solicit comments and concerns regarding the proposal so that we might address them in our analysis. When completed, the Draft EA will be forwarded for your review. A list of agencies contacted is attached. Please let us know if you feel additional agencies should review the proposal. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative effects. Any questions regarding this proposal should be directed to Mr. James Bellon at 580-481-7606. Please forward your written comments by April 7, 2009 to Mr. Bellon at the following address:

97 CES/CEAO
401 L. Avenue, Bldg 358
Altus AFB, Oklahoma 73523-5138

Sincerely,

Charles R Butchee

Charles R. Butchee,YC-02, DAF
Chief, Asset Management Flight
97th Civil Engineer Squadron

Attachments:
1. List of Agencies Contacted
2. Figure of Proposed Action Projects

Enclosures for Scoping Letter

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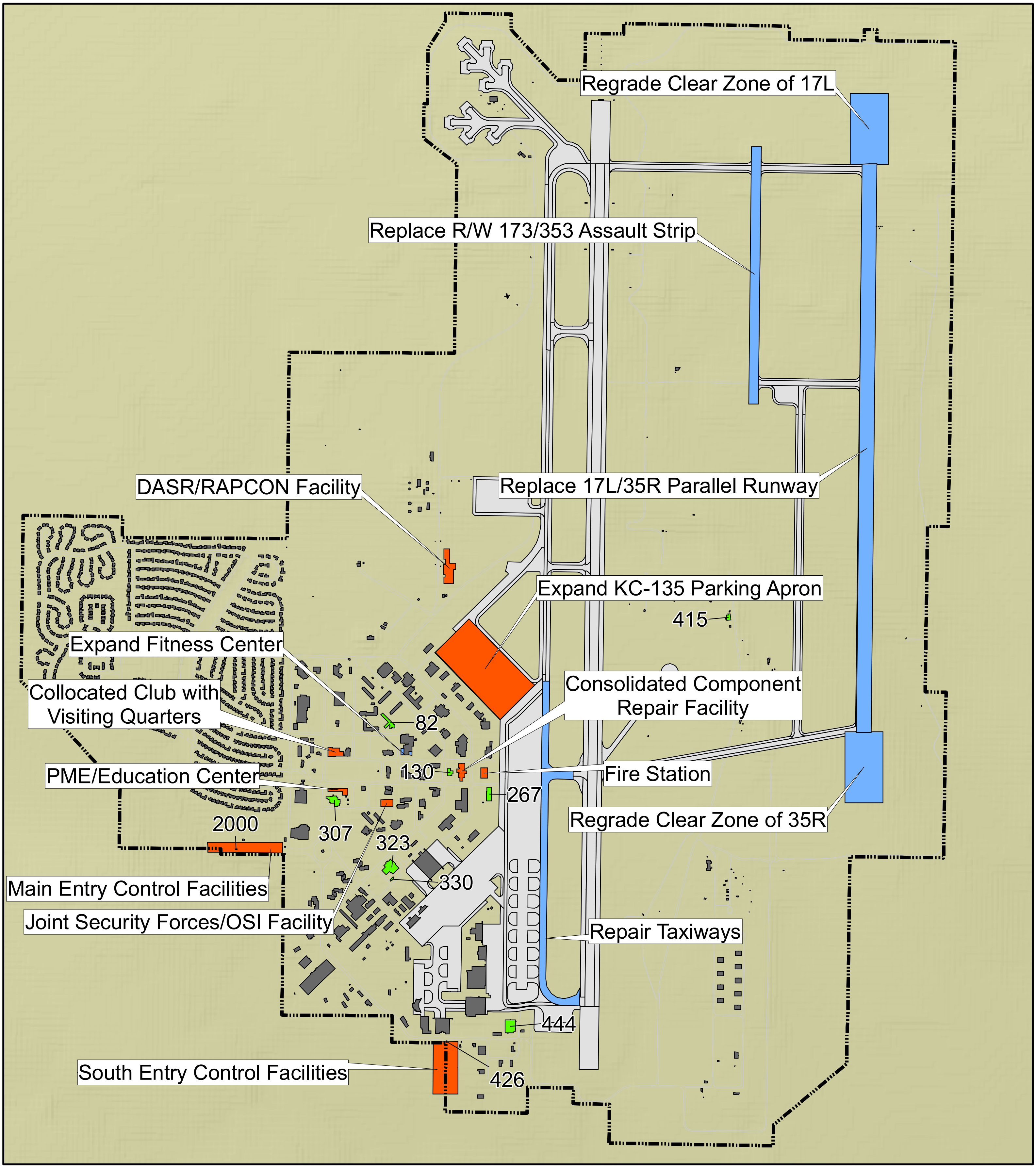
Altus AFB
Environmental Assessment
General Plan-based Environmental Impact Analysis Process

IICEP Mailing List
Final January 12, 2009

Agency	Department	Title	Title-1	Name	Last Name	Address	City	State	Zip Code
US Bureau of Indian Affairs	Muskogee Area Office	Muskogee Area Director	Ms.	Jeanette	Hannah	3100 W. Peak Blvd.	Muskogee	OK	74401
Apache Tribe of Oklahoma		Director	Ms.	Donna	Prengiss	P.O. Box 1220	Andarko	OK	73005
Cherokee Nation, Oklahoma		Principal Chief	Mr.	Chad"Corntassle"	Smith	P.O. Box 948	Tahlequah	OK	74464
Caddo Indian Nation of Oklahoma		Environmental Director	Ms.	Polly	Edwards	P.O. Box 487	Binger	OK	73009
Chickasaw Nation		Governor	Mr.	Bill	Anoatubby	P.O. Box 1548	Ada	OK	74280
Comanche Nation		Tribal Chairman	Mr.	Wallace	Coffey	P.O. Box 908	Lawton	OK	73502
State Historic Preservation Office	Oklahoma Historical Society	Deputy State Historic Preservation Officer	Ms.	Melvina	Heisch	2401 N. Laird Ave	Oklahoma City	OK	73105
United States Army Corps of Engineers	Environmental Restoration Mission					1645 S. 101 E Ave	Tulsa	OK	74128-4609
United States Department of Agriculture	Natural Resources Conservation Service	State Conservationist	Mr.	Ron L.	Hillard	100 USDA, Suite 206	Stillwater	OK	74074-2655
United States Fish and Wildlife Service	Oklahoma Ecological Services Field Office					222 South Houston, Ste A	Tulsa	OK	74127
Board of County Commissioners	Jackson County	County Commissioners				101 North Main	Altus	OK	73521
Department of Environmental Quality	Consumer Assistance Program		Ms.	Margaret	Graham	P.O. Box 1677	Oklahoma City	OK	73201
Oklahoma Department of Wildlife Conservation	Natural Resources Section	Agency Representative				1801 North Lincoln	Oklahoma City	OK	73505
USEPA, Region VI	Federal Assistance Section	Agency Representative				1445 Ross Avenue	Dallas	TX	75202
Oklahoma Natural Heritage Inventory	Oklahoma Biological Survey	Agency Representative				111 E. Chesapeake Street	Norman	OK	73019-0575



Legend

- Altus Air Force Base
- Roads
- Airfield
- Existing Buildings
- Proposed Action Demolition Projects
- Proposed Action Construction Projects
- Proposed Action Renovation Projects

0 1,000 2,000 Feet

N

Proposed Action Demolition, Construction, and Renovation Projects

Altus Air Force Base
Altus, OK

File: \\Fsfed01\TIG\AETC\Altus\mxd\construct_demo.mxd, 29-Jan-09 15:22, ricksc

Scoping Responses

(no document text this page)

Oklahoma Biological Survey

Oklahoma Natural Heritage Inventory

OKLAHOMA BIOLOGICAL SURVEY
111 E. Chesapeake Street
Norman, Oklahoma 73019-5112, USA
(405) 325-1985
FAX: (405) 325-7702

Charles R. Butchee
Chief, Asset Management Flight
97th Civil Engineer Squadron
401 L Avenue
Altus Air Force Base
Altus, OK 73523

OBS Ref: 2009-135-STA-OTH

March 9, 2009

Re: Environmental Assessment

Dear Mr. Butchee,

Regarding your request for information on the presence of endangered species or other elements of biological significance at the referenced site, we have reviewed the information currently in the Oklahoma Natural Heritage Inventory database and have found no records of elements of concern at or near the locations you describe.

Because the ONHI database is only as complete as the information that has been collected, we cannot say with certainty whether or not a given site harbors rare species or ecological communities. For this reason, if you are concerned about species of federal interest, we urge you to consult with the Tulsa office of the U.S. Fish and Wildlife Service (918.581.7458), as they may have additional information of which we are unaware.

The information we provide to you is a product of a cooperative agreement between the Oklahoma Biological Survey (OBS) and the Oklahoma Department of Wildlife Conservation (ODWC). For more information about the likely environmental impacts of your project on state endangered species, please contact William Ray at ODWC (405-424-6062). You may also find our web site helpful for expediting your information request. See http://www.biosurvey.ou.edu/fastforward.html.

Sincerely,

Joseph E. Collins
(for)Ian Butler
Biological Data Coordinator

OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY

STEVEN A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

BRAD HENRY
Governor

March 17, 2009

James Bellon
97 CES/CEAO
401 L. Avenue, Bldg 358
Altus AFB, Oklahoma 73523-5138

Dear Mr. Bellon:

RE: EA of proposals included in the General Plan of the Capital Improvements Program for Altus AFB

In response to your request, we have completed a general review of the above referenced project with regard to water quality, air quality, solid waste and man-made hazards. At this time, we have no objections to the project, however we do have the following environmental guidelines:

a) Any project which includes the removal or installation of water and/or sewer lines and indoor plumbing shall conform to all relevant plumbing codes.
b) Any project which includes the removal of paints shall conform to all relevant lead-based paint regulations.
c) All projects which include the handling and/or removal of asbestos shall conform to all relevant asbestos regulations.
d) Oklahoma is currently in attainment with Federal Air Quality Regulations; therefore, during any construction or demolition work, reasonable precautions must be taken to protect air quality by minimizing fugitive dust emissions.

If you have any questions or need clarification, do not hesitate to contact me at 405/702-1019 or 1/800-869-1400.

Sincerely,

Margaret M. Graham

Margaret M. Graham
Environmental Review Coordinator
CUSTOMER ASSISTANCE PROGRAM

707 NORTH ROBINSON, P.O. BOX 1677, OKLAHOMA CITY, OKLAHOMA 73101-1677

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

March 27, 2009

Regulatory Office

Mr. Charles R. Butchee
Chief, Assets Management Flight
97th Civil Engineering Squadron
401 L. Avenue
Altus AFB, OK 73523

Dear Mr. Butchee:

This is in reference your letter dated March 6, 2009, concerning the Capital Improvement Program at Altus AFB. We have reviewed the submitted data relative to Section 404 of the Clean Water Act (CWA).

The provided information does not indicate that a placement of dredged or fill material will be required, permanently or temporarily, into any "waters of the United States," including jurisdictional wetlands. Therefore, your proposal is not subject to regulation pursuant to Section 404 of the Clean Water Act, and a Department of the Army (DA) permit will not be required.

Should your method of construction necessitate such a discharge into any "waters of the United States," we suggest that you resubmit that portion of your project so that we may determine whether an individual DA permit will be required.

Although DA authorization is not required, this does not preclude the possibility that other Federal, State, or local permits may be required.

Your project has been assigned Identification Number 2009-198. Please refer to this number during future correspondence. If further assistance is required, contact Mr. Marcus Ware at 918-669-7403.

Sincerely,

Diane Ralston

for David A. Manning
Chief, Regulatory Office

OKLAHOMA

BRAD HENRY, GOVERNOR
GREG D. DUFFY, DIRECTOR

wildlifedepartment.com

DEPARTMENT OF WILDLIFE CONSERVATION

P.O. Box 53465 Oklahoma City, OK 73152 PH. (405) 521-3851

April 15, 2009

Mr. Charles R. Butchee
Chief, Asset Management Flight
90th Civil Engineering Squadron
401 L Avenue
Altus AFB, OK 73523

RE: EA Preparation for Installation Development at Altus Air Force Base (AFB)

Dear Mr. Butchee,

This is in response your letter dated March 6, 2009 requesting preliminary comments on the proposed construction for inclusion in the Environmental Assessment (EA) for implementation of the Capital Improvements Program as defined in your installation General Plan for AFB. AFB is located in Altus, Jackson County, Oklahoma.

The Oklahoma Department of Wildlife Conservation has reviewed the map and other information provided for the project and compared these against our current records for state and federally listed threatened and endangered species, critical habitat, wetlands, floodplains, sensitive waters and watersheds, wildlife management areas and other wildlife resources. Based on evaluation of the information you provided, no state listed threatened or endangered species should be impacted by the proposed project and the project should have minimal impact to the surrounding environment.

However, the Texas Horned Lizard (*Phrynosoma cornutum*) has been known to occur in the project area. *P. cornutum* is listed as a species of special concern Category II (SS2). A category II species of special concern is defined as a native species identified by technical experts as possibly threatened or vulnerable to extirpation but for which little, if any, evidence exists to document the population level, range or other factors pertinent to its status. Included with this correspondence is a brochure on the Texas Horned Lizard. Please note the sighting report form which can be used by the applicant as the construction phase progresses. For additional information on state of Oklahoma threatened and endangered species, we recommend that you contact the Oklahoma Natural Heritage Inventory, 111 E. Chesapeake Street, Norman, Ok. 73019. For information on federally listed threatened or endangered species, contact the USFWS, Ecological Services, 9014 E. 21st Street, Tulsa, OK 74129 or visit them online at http://www.fws.gov/southwest/es/oklahoma/.

We appreciate the opportunity to review and provide comments on this project. If we can be of further assistance, please contact our Environmental Section at 405-424-6062.

Sincerely,

William Ray
Environmental Biologist

Enclosure

Additional Information Sources on Horned Lizards

Collins, J.T. 1994. *Amphibians and Reptiles of Kansas.* University of Kansas Publications.

Sievert, G. and L. Sievert. 1993. *A Field Guide to the Reptiles of Oklahoma.* Oklahoma Department of Wildlife Conservation. Available from the Wildlife Diversity Program for $5 ($4 + $1 p&h).

Sherbrooke, W.C. 1981. *Horned Lizards, Unique Reptiles of Western North America.* Southwest Parks and Monuments Association.

Funding Horned Lizard Research

This brochure was developed and printed by the Oklahoma Wildlife Diversity Program (formerly Nongame Wildlife Program) in cooperation with the U.S. Fish and Wildlife Service through a Section 6 Endangered Species Act grant. Additional funding was provided by thousands of Oklahoma school children who raised money through the "Cans 4 Critters" fundraising contest.

You can support Texas horned lizard research by "Searching for the Scissortail" (shown below) on your state tax form and sharing part of your refund with the Wildlife Diversity Program. Purchases of special Wildlife Conservation License Plates also fund wildlife conservation, education and recreation. Two plate designs are available, featuring a scissor-tailed flycatcher or white-tailed deer. Applications are available at local tag agencies or from the Wildlife Diversity Program.

Wildlife Diversity Program

This brochure is dedicated to the memory of Jeffrey Black, Ph.D., whose untimely death in 1995 was a great loss to all who study and appreciate wildlife. A member of the Wildlife Diversity Program's technical advisory committee, Dr. Black was a respected herpetologist and tremendous supporter of wildlife conservation.

OKLAHOMA'S MOST WANTED: THE TEXAS HORNED LIZARD

Wildlife Diversity Program

Oklahoma Department of Wildlife Conservation
1801 N. Lincoln
Oklahoma City, OK 73105
(405) 521-4616

The Texas horned lizard (*Phrynosoma cornutum*) belongs to a unique group of North American lizards known as horned lizards. All 13 species of horned lizards are small, earth-toned and have rounded, flat bodies. The scientific name for the group, *Phrynosoma*, literally means "toad-body." Because of their resemblance to toads in body shape and coloration, many people know these lizards as "horned toads" or "horny toads." But despite their appearance, horned lizards are in no way related to toads; their closest relatives in Oklahoma are the fence lizards commonly seen in wooded habitats.

Horned lizards are named for the unusual hornlike spines on the back of their heads and the smaller spines scattered over their backs and sides. These "horns" do not contain bone but are actually specialized body scales that serve to protect the lizards from predators. They help camouflage the lizard by breaking up the outline of its body and make the lizards more difficult to swallow, thus discouraging some predators.

From the tip of the snout to the base of the tail, adult Texas horned lizards reach a length of 4 to 6 inches. Females often grow slightly larger than males, but the difference is not great enough to determine the sex of a lizard by sight. Males and females have few external differences except that males have visible pores along the lower hind surface of each thigh and a slight swelling at the base of the tail. Little information is available on their normal lifespan, but horned lizards can live at least five years. A second horned lizard species, the round-tailed horned lizard (*Phrynosoma modestum*), occurs in the northwest corner of the Oklahoma panhandle. This species' coloration is more pale and has less distinct "horns."

Adaptations for Survival

Avoiding predators influences many of the Texas horned lizard's behavioral and physical adaptations. Though capable of running quickly for short distances, they rely more on camouflage than speed for protection. Their first line of defense is their mottled brown body coloration that helps hide them against bare soil and dead leaves. For further camouflage, local populations tend to resemble the color of their area's soil. Populations in areas of sandy soil may have a yellowish tint while populations in other areas may have a reddish or dark brown tint. The body shape is also an adaptation to avoid the attention of would-be predators. When lying against the soil, the flattened body casts only a slight shadow, and the spines on the back and sides help break up the body's outline. A motionless horned lizard is difficult to see against bare soil.

Life of the Horned Lizard

Texas horned lizards feed on a variety of ground-dwelling arthropods such as beetles and spiders, but harvester ants (red ants) are their primary prey, comprising 90 percent or more of their diet. These relatively large ants are seedeaters and live in prairies, woodland margins and shrublands with abundant grasses and forbs. Texas horned lizards lie motionless along harvester ant trails and capture ants as they pass to and from their colony. When an ant approaches, the lizard takes a few quick steps forward, flicks out its tongue, captures its prey and swallows it whole. Behavioral observations have shown that horned lizards may eat as many as 70 harvester ants a day! Horned lizards usually attack solitary ants several yards away from the harvester ant colony, and avoid the colony's center where they would be mobbed by droves of biting ants.

Horned lizards obtain most of the water they need from the ants they eat or by licking dew off vegetation. During light rains, horned lizards may drink the water that collects on their bodies by arching their backs and causing the rainwater to flow forward toward the mouth. Like most reptiles, horned lizards are adapted to conserve body water. Their kidneys excrete wastes and excess salts in the form of uric acid, a semi-solid substance containing very little water, and their bodies' scales protect the underlying skin from drying and losing moisture.

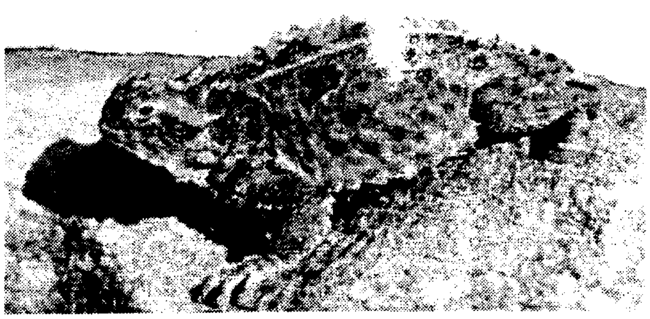
Texas horned lizards emerge from hibernation between late March and mid-April. They seem to be most active at temperatures between 80 - 90° F, and during the morning hours they spend much of their time lying in exposed, sunny locations to raise their body temperature.

Most of their hunting is done between late morning and dusk, but on the hottest days of summer they may be active only during the morning and spend the afternoon buried just beneath the soil or under the shelter of vegetation. In October they burrow underground to begin their winter hibernation.

Courtship and mating take place in late May and June. Courtship consists of a rapid head bobbing display by the male, which is followed by head nodding from the female. One to two weeks after mating, the female digs a slanted tunnel approximately 6 to 8 inches into the ground. She then lays a clutch of 8 to 30 eggs--each about the size and shape of a small jelly bean. After laying her eggs, the female places dirt back into the tunnel and scratches the ground around the entrance to hide its presence. The female provides no further care for her eggs or young and is not likely to lay more eggs that year. The eggs incubate for approximately two months, then hatch in August or September. When the young emerge, they look like miniature versions of the adults, about 1 1/8 to 1 1/4 inches long.

Finding Horned Lizards

The Texas horned lizard was historically found in scattered locations across Oklahoma (except the extreme southeast) as well as adjacent portions of Texas, Kansas and Missouri. Many people associate this species with an arid environment, sandy soils and sparse vegetation. While horned lizards can thrive in this environment, they are adaptable to a wide range of conditions, the abundance of harvester ants appearing to be one of the most important factors determining their distribution. As a general trend, horned lizards seem to be most common in habitats with healthy harvester ant populations, sandy or loamy soils, and moderate grass or shrub cover. As long as harvester ants and some ground vegetation are present for food and cover, they may be found on short and mid-grass prairies, along woodland edges and around low thickets of scrubby oaks and sand plums. Horned lizards appear to avoid areas of tall, dense grass and deep woods.



WANTED:

Horned Lizard Researchers

The Texas horned lizard is familiar to most Oklahomans, yet rarely has it been studied in detail, leaving many unanswered questions about its biology. We hope you will help us in the study of the Texas horned lizard. **If you see one, please take a few minutes to record your observations on this form and return it to: Oklahoma Wildlife Diversity Program, 1801 N. Lincoln, Oklahoma City, OK 73105.** Your assistance can help us all to better understand this fascinating animal.

TEXAS HORNED LIZARD SIGHTING REPORT FORM

Date of Sighting: ____________

Number Lizards Seen: ____ Adults ____ Juveniles

Spines present on head and sides? ____ Yes ____ No

Horned lizards seen here in the past? ____ Yes ____ No

If yes, how many years? ________

Were harvester ants present? ____ Yes ____ No

Soil Type (circle those that apply):

Sand Silt Clay Gravel

County: ____________

Distance from nearest town / Legal Description (example: 2 miles east, 3 miles south of town X): ____________

____

____

Habitat description where lizard found (example: grazed pasture with scattered mesquite trees): ____________

____

____

Other Information: ____________

____

____

Name (optional): ____________

Address (optional): ____________

____

____

Where Have All the Horned Lizards Gone?

The Texas horned lizard remains common in parts of western Oklahoma, but has shown a dramatic decline in both range and population size in the eastern and central parts of the state since the 1960s. Several possible reasons have been proposed for the decline, but little evidence exists to determine the true causes. The horned lizard's decline is most likely the result of a combination of factors with the importance of each factor varying from one part of the state to the next.

Increased use of ***pesticides*** may have reduced the harvester ant population in some areas, thus reducing the horned lizard's main food supply. In agricultural areas, ants are rarely considered pest species but may be killed by insecticides used against other insects. Also, herbicides used to eliminate weeds may affect harvester ant populations by reducing the abundance or quality of seeds on which the ants feed. In residential areas, ants often are poisoned by people fearing ant bites or wanting to keep them away from stored food. Because harvester ant colonies are easily visible, these harmless ants often are destroyed.

Prolonged periods of hot, dry weather associated with extreme ***drought*** may cause harvester ants to go dormant and temporarily eliminate the lizard's most important food source. A severe drought hit Oklahoma in the early 1980s and may have caused some of the decline.

Because horned lizards may lie on roads to bask on the warm pavement or gravel, they are vulnerable to ***vehicle-kills***. As the number of roads and vehicles increase, the probability that horned lizards will be hit and killed increases.

In some areas, the number of potential ***predators*** on horned lizards may be higher now than in the past. Though little evidence has measured the effect of predation on horned lizard populations, increased populations of possible predators such as feral cats, cattle egrets and great-tailed grackles have been suggested in recent years, especially around towns and pastures.

The ***collection*** of horned lizards as pets or to sell commercially in the pet trade may have affected some populations, especially near towns and cities. Anecdotal accounts state that thousands of horned lizards were shipped out of Oklahoma and Texas and sold for pets in the eastern U.S. and Europe from the early 1900s until the 1980s. Because of their special diet, most of these lizards died from improper care within a few weeks, and no self-sustaining captive-bred populations were ever developed. Horned lizards now are protected in Oklahoma and Texas and this activity is illegal; however, where collecting was common, some populations may not have recovered yet.

As native habitats are modified by ***human development***, some of this land may no longer be suitable for horned lizards or their harvester ant prey. With less suitable habitat, fewer lizards can be supported. Also, as the amount of habitat declines, the remaining patches of good habitat become more isolated from each other. Because of their small size and limited ability to travel long distances, horned lizards have difficulty moving between widely spaced habitat patches. Populations in isolated habitats are more susceptible to local extinction from catastrophic events, and once an isolated population is gone, it is difficult for other horned lizards to resettle the area.

Crying "Bloody" Tears

Horned lizards are known to squirt a thin stream of blood from the corners of their eyes when they are handled or disturbed. This does not appear to be a defense mechanism, but an uncontrollable reaction when frightened. During hot weather, horned lizards cool their bodies by increasing the flow of blood just below the skin to help disperse body heat. If a warm lizard is disturbed or excited, its blood pressure may increase and blood lying in the sinuses behind each eye is uncontrollably forced out to relieve pressure.

Oklahoma's Reptile Regulations

The Texas horned lizard is classified as a "Species of Special Concern." In 1992, Oklahoma regulations established a year-round closed season on these lizards and 20 other rare reptile and amphibian species. **It is unlawful to kill, capture, keep as pets or sell Texas horned lizards without specific written permission.** While the Texas horned lizard is not an endangered or threatened species, its widespread decline has caused concern for its future status. The closed season is designed to protect it from unnecessary collection.

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Notice of Availability

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PUBLIC NOTICE

NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT AND
PROPOSED FINDING OF NO SIGNIFICANT IMPACT FOR
GENERAL PLAN-BASED ENVIRONMENTAL IMPACT ANALYSIS PROCESS
AT ALTUS AIR FORCE BASE (AFB), OKLAHOMA

An Environmental Assessment (EA) has been prepared to analyze the proposed development associated with the implementation of Altus AFB's Capital Improvements Program. The EA, prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations, and Air Force instructions implementing NEPA; evaluates potential impacts of the proposed and alternative actions on the environment including the No-action Alternative.

Copies of the EA are available at Altus Public Library (421 North Hudson, Altus, OK 73521, 580-477-2890) and the Altus AFB Library, Building 65 (109 E. Avenue, Altus AFB, OK 73523, 580 481-6302).

Comments may be submitted through September 7, 2009 and should be provided to Mr. James Bellon, 97 CES/CEAO, 401 L. Avenue, Bldg. 358, Altus AFB, OK 73523-5138, (580)-481-7606.

PRIVACY ADVISORY NOTICE

Public comments on this Draft EA are requested pursuant to NEPA, 42 United States Code 4321, et seq. All written comments received during the comment period will be made available to the public and considered during the final EA preparation. Providing private address information with your comment is voluntary and such personal information will be kept confidential unless release is required by law. However, address information will be used to compile the project mailing list and failure to provide it will result in your name not being included on the mailing list.

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Draft EA Letter Examples

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DEPARTMENT OF THE AIR FORCE
97th AIR MOBILITY WING
ALTUS AIR FORCE BASE OKLAHOMA

6 Aug 09

Charles R. Butchee
Chief, Asset Management Flight
97th Civil Engineer Squadron
401 L Avenue
Altus AFB, OK 73523

Polly Edwards
Environmental Director
Caddo Indian Nation of Oklahoma
P.O. Box 487
Binger, OK 73009

Dear Ms. Edwards,

The draft Environmental Assessment (EA) for the General Plan-Based Environmental Impact Analysis Process at Altus Air Force Base (AFB), Oklahoma will be released for public comment on 9 August 2009. The Air Force is proposing to implement the Capital Improvements Program (CIP) associated with Altus AFB's General Plan. The purpose of the proposed and alternative actions is to construct and/or modify facilities and infrastructure at Altus AFB (1) as a part of the overall CIP, or (2) as needed to support future mission growth and development on the installation. The projects resulting from the CIP requirements are needed to improve the effectiveness of training; enhance quality of life; replace or renovate old inadequate facilities; correct current deficiencies; and accommodate potential new mission activities, personnel, and equipment.

The draft EA describes and analyzes alternative plans for installation development, including the No-action Alternative, under which installation development would not occur. Copies of the draft EA are maintained at the Altus Public Library (421 North Hudson, Altus, OK 73521, 580-477-2890) and the Altus AFB Library, Building 65 (109 E. Avenue, Altus AFB, OK 73523, 580 481-6302).

We request your participation in the process, and solicit any comments or concerns you may have on the draft EA. Comments may be submitted through 7 September 2009 and should be provided to Mr. James Bellon at the following address:

97 CES/CEAO
401 L. Avenue, Bldg. 358
Altus AFB, OK 73523-5138

Sincerely,

Charles R. Butchee, YC-02, DAF
Chief, Asset Management Flight
97th Civil Engineer Squadron

Attachments:
Draft Environmental Assessment

DEPARTMENT OF THE AIR FORCE
97th AIR MOBILITY WING
ALTUS AIR FORCE BASE OKLAHOMA

9 Sep 09

Charles R. Butchee
Chief, Asset Management Flight
97th Civil Engineer Squadron
401 L Avenue
Altus AFB, OK 73523

Honorable T.L. Gramling
220 E. Commerce
Altus, OK 73521

Dear Mayor Gramling:

The draft Environmental Assessment (EA) for the General Plan-Based Environmental Impact Analysis Process at Altus Air Force Base (AFB), Oklahoma will be released for public comment on 9 August 2009. The Air Force is proposing to implement the Capital Improvements Program (CIP) associated with Altus AFB's General Plan. The purpose of the proposed and alternative actions is to construct and/or modify facilities and infrastructure at Altus AFB (1) as a part of the overall CIP, or (2) as needed to support future mission growth and development on the installation. The projects resulting from the CIP requirements are needed to improve the effectiveness of training; enhance quality of life; replace or renovate old inadequate facilities; correct current deficiencies; and accommodate potential new mission activities, personnel, and equipment.

The draft EA describes and analyzes alternative plans for installation development, including the No-action Alternative, under which installation development would not occur. Copies of the draft EA are maintained at the Altus Public Library (421 North Hudson, Altus, OK 73521, 580-477-2890) and the Altus AFB Library, Building 65 (109 E. Avenue, Altus AFB, OK 73523, 580 481-6302).

It has come to our attention that your office was inadvertently left off of the distribution list. We request your participation in the process, and solicit any comments or concerns you may have on the draft EA. Comments may be submitted through 15 September 2009 and should be provided to Mr. James Bellon at the following address:

97 CES/CEAO
401 L. Avenue, Bldg. 358
Altus AFB, OK 73523-5138

Sincerely,

Charles R. Butchee, YC-02, DAF
Chief, Asset Management Flight
97th Civil Engineer Squadron

Attachments:
Draft Environmental Assessment

Draft EA Responses

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RECEIVED

AUG 10 2009

US FISH & WILDLIFE SERVICE
TULSA ES

DEPARTMENT OF THE AIR FORCE
97th AIR MOBILITY WING
ALTUS AIR FORCE BASE OKLAHOMA

6 Aug 09

Charles R. Butchee
Chief, Asset Management Flight
97th Civil Engineer Squadron
401 L Avenue
Altus AFB, OK 73523

United States Fish and Wildlife Service
Oklahoma Ecological Services Field Office
9014 E. 21st Street South
Tulsa, OK 74129-1428

To Whom It May Concern,

The draft Environmental Assessment (EA) for the General Plan-Based Environmental Impact Analysis Process at Altus Air Force Base (AFB), Oklahoma will be released for public comment on 9 August 2009. The Air Force is proposing to implement the Capital Improvements Program (CIP) associated with Altus AFB's General Plan. The purpose of the proposed and alternative actions is to construct and/or modify facilities and infrastructure at Altus AFB (1) as a part of the overall CIP, or (2) as needed to support future mission growth and development on the installation. The projects resulting from the CIP requirements are needed to improve the effectiveness of training; enhance quality of life; replace or renovate old inadequate facilities; correct current deficiencies; and accommodate potential new mission activities, personnel, and equipment.

The draft EA describes and analyzes alternative plans for installation development, including the No-action Alternative, under which installation development would not occur. Copies of the draft EA are maintained at the Altus Public Library (421 North Hudson, Altus, OK 73521, 580-477-2890) and the Altus AFB Library, Building 65 (109 E. Avenue, Altus AFB, OK 73523, 580 481-6302).

We request your participation in the process, and solicit any comments or concerns you may have on the draft EA. Comments may be submitted through 7 September 2009 and should be provided to Mr. James Bellon at the following address:

97 CES/CEAO
401 L. Avenue, Bldg. 358
Altus AFB, OK 73523-5138

NO OBJECTION FINDING
The U.S. Fish and Wildlife Service does not object to implementation of the described action.
Date 9/16/2009
Approved by [signature]
U.S. FISH AND WILDLIFE SERVICE, TULSA, OK

Sincerely,

[signature]

Charles R. Butchee, YC-02, DAF
Chief, Asset Management Flight
97th Civil Engineer Squadron

Attachments:
Draft Environmental Assessment

Chris Rausch
PO Box 8982
Altus, OK 73522-8982

Mr. James Bellon
97 CES/CEAO
119 607 South 1st Street
Building 396
Altus AFB, OK 73523-5138

9/3/2009

Mr. Bellon,

1. Reference: Paragraph 2.3.1 Flying Operations of Draft Environmental Assessment June 2009.
2. I want to voice strong opposition to this west pattern at Altus AFB. It will increase noise in the town of Altus and place large aircraft dangerously close to the general aviation airport at Altus Quartz Mountain.
3. I do not see any need what so ever for infringing on general aviation airspace.
4. Previously there were C-141, and C-5 aircraft at Altus AFB and there was never a west pattern. Now that there are less aircraft at Altus and less flying operations the base feels a need to acquire more airspace?
5. Flying operations should decrease because more flying training is done in the simulators.
6. This seems like a bad idea that will generate more risk to General Aviation aircraft.
7. The separation distance between Altus AFB west pattern and Quartz Mountain Airport is insufficient if a pilot temporarily loses situational awareness. Large military aircraft and small general aviation aircraft do not mix. With all the emphasis the FAA and the military place on flying safety I'm surprised that this idea of a west pattern at Altus AFB was even considered; especially when there seems to be no verifiable need for this intrusion.

Chris Rausch

September 4th 2009

A west closed down wind for runway 17/35 at Altus AFB will create a safety issue in that arriving/departing aircraft will have to change radio frequencies at least three time Approach/tower/Unicom, all within a short period of time . Another factor is that the traffic pattern could cause problems with the local AXS traffic in that the KC-135 cannot make the turn without extending almost into the AXS pattern, I personally witnessed this first hand. One must remember that local training is an ongoing thing at AXS and students can and will stray as well as transit aircraft not familiar with the area.
Also there is the noise factor as well as safety,(things falling off aircraft) I do not think that the current great relations and support from the community would be worth risking just to save a small amount of fuel/time by utilizing the west pattern. Altus Quartz Mountain Regional Airport is an important and vital economic tool for Altus as well as the Base, If transit Aircraft should find it difficult to get in and out of the airport it will have a negative effect on fuel sales as well as aircraft operations
I cannot express my sincere and strongest opposition to this idea, This will be bad for the aviation community as well as for the general public for reasons stated above

Greg Camp
Altus Quartz Mountain Regional Airport Director

97th Civil Engineering Squadron
ATTN: Mr. James Bellow
607 S 1st Street
Altus AFB, OK 73523

5 Sep 2009

Dear Mr. Bellow,

This is in reference to the Draft EA.

One Page 2-2, reference is made to initiating a west VFR traffic pattern for the inside (west) runway. I wish to comment on this proposal as an air safety hazard, as well as a potential hazard to the City of Altus.

The proposed pattern will conflict with traffic at the Altus/Quartz Mountain airport (AXS) in that the downwind leg will cross the 45 degree entry leg to the downwind leg for runway 17 at AXS and have great potential for overlapping traffic with heavy jets in close proximity to the light aircraft traffic at AXS. Even though the routes appear to be separated by 1 mile, the wake turbulence from the KC135 and C17 aircraft spreads and lingers and can upset a lighter aircraft.

When traffic is using runway 35 at both airports, there is a great chance that the heavy aircraft will be very close to the departure path of the aircraft from AXS with the potential for 1) wake turbulence lingering in the departure path and 2) head-on traffic conflict.

In the occasional case when the base traffic is using runway 35 and AXS is using runway 17, there would be a good possibility of head-on traffic conflict.

My understanding is the the west downwind is supposed to be over Veteran's Drive. However, during the test of the concept the turn radius of the KC135 was shown to be too great to stay over the Veteran's Drive limit. Add to that, consider that the heavies will be training student pilots and the west pattern becomes much wider than planned. This larger pattern would bring the heavies over a heavily populated area of the city that includes the high school, hospital and churches.

In Chapter 6, List of Persons and Agencies Consulted, lists only the City Sanitation Department. One would think that the Mayor, City, City Administrator, and possibly City Council, would be among those contacted. Moreover, in dealing with airspace issues, the Airport Advisory Board and the Airport Director should be in the loop.

In sum, the proposed west VFR pattern would be hazardous to 1) air traffic, both military and civilian, and 2) citizens on the ground in the area from Park Lane to the base in width and in length from 2-3 miles north to the same distance south of the city.

Sincerely,

Ben A Bailey

Ben Bailey
PO Box 41
Altus, OK 73522
580 482-2142

OKLAHOMA

BRAD HENRY, GOVERNOR
RICHARD T. HATCHER, DIRECTOR

wildlifedepartment.com

DEPARTMENT OF WILDLIFE CONSERVATION

1801 N. LINCOLN P.O. BOX 53465 OKLAHOMA CITY, OK 73105 PH. (405) 521-3851

September 7, 2009

Mr. James Bellon
97 CES / CEAO
401 L. Avenue, Building 358
Altus Air Force Base, OK 73523-5138

Subject: Draft EA for the Environmental Impact Analysis for the General Plan for Altus AFB

Dear Mr. Bellon,

This letter is written in response to your letter of August 6, 2009 regarding the Draft Environmental Assessment for the activities covered under the Altus Air Force Base General Plan. These activities include the demolition of six existing buildings and the construction or renovation of at least nine structures including a fire station, education center, repair facility and the South and Main Base Entries. Also included is the establishment of a Visual Flight Rules closed air traffic pattern on the west side of the Base. All of the proposed activities will take place on previously developed sites within the Base. We understand, also, that there will be no additional aircraft, personnel or missions assigned to Altus AFB as a result of the General Plan.

Please understand that our comments pertain only to the biological resources aspect of the draft environmental analysis as described on pages 3-30 through 3-32. This includes endangered species, although only the U.S. Fish and Wildlife Service has the authority to provide permits or clearances under the Endangered Species Act. If you have not sent this notice to the USFWS, we recommend that you contact their Tulsa Field Office for information regarding federally threatened and endangered species. There are no state-listed threatened or endangered species on or in the vicinity of Altus Air Force Base, and due to the urban and previously developed condition of the sites that will be directly affected by the demolition, construction and renovation activities specified in the General Plan, we do not anticipate any substantial impacts to regional populations of sensitive wildlife species.

We appreciate the opportunity to review and provide comments on this Environmental Assessment. If you have any questions regarding this letter or would like additional information regarding wildlife resources, please contact me at (405) 424-2728 or mhowery@zoo.odwc.state.ok.us.

Sincerely,

Mark D. Howery

Mark D. Howery
Wildlife Diversity Biologist

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101ST EAST AVENUE
TULSA, OKLAHOMA 74128-4609

September 22, 2009

Regulatory Office

Mr. James Bellon
97 CES/CEAO
401 L. Avenue, Bldg. 358
Altus AFB, OK 73523-5138

Dear Mr. Bellon:

Please reference a letter of August 6, 2009, signed by Mr. Charles R. Butchee regarding a draft Environmental Assessment (EA) of the General Plan-Based Environmental Impact Analysis Process at Altus Air Force Base (AFB), Oklahoma. The AFB is located in Jackson County, Oklahoma.

There are jurisdictional "waters of the United States" located on Altus AFB. Currently the EA does not refer to the placement of dredged or fill material being placed permanently or temporarily into a jurisdictional water, therefore no permit is needed pursuant to Section 404 of the Clean Water Act. If future proposals necessitate a discharge into a jurisdictional water, we suggest that you submit that proposal so that we may determine what type of permit will be required.

Although DA authorization is not required, this does not preclude the possibility that other Federal, State, or local permits may be required.

Your project has been assigned Identification Number 2009-664. Please refer to this number during future correspondence. If further assistance is required, please contact Ms. Helen J. Williams at 918-669-7009.

Sincerely,

for Helen J. Williams

David A. Manning
Chief, Regulatory Office

Draft EA Response to Comments Matrix

(no document text this page)

Altus AFB Public Comment Response Matrix

No.	Commenter	Comment	Response	Text Change
1	Mr. Chris Rausch & Mr. Greg Camp	The west pattern will increase noise in the town of Altus.	In considering this action, the Air Force conducted noise modeling to determine the effects a west pattern would have to the noise setting in the surrounding community. The results of this modeling are presented in the DEA and indicate that noise levels from the west pattern would be below levels of significance for noise sensitive receptors (e.g. residences, hospitals)	N/A
2	Mr. Chris Rausch	The west pattern will infringe on general aviation airspace and place large aircraft dangerously close to the Altus Quartz Mountain general aviation airport.	The comment appears to expresses a concern about the adequacy of aircraft separation between aircraft operating from and in the vicinity of Altus Quartz Mountain airport and the airfield at Altus AFB. Under VFR, the pilot in command of each aircraft is responsible for aircraft separation, using see-and-avoid. Under IFR, separation services are provided by FAA or military air traffic controllers within controlled airspace; however, when weather conditions permit, the pilot in command still retains responsibility for separation under see and avoid. Compared to most public-use airfields, the Quartz Mountain airport which does not have an air traffic control tower lies unusually close to another airfield that does have a control tower (Altus AFB). It is unusual to have more than one airport in a Class D airspace ring and the Quartz Mountain lies within the 6-NM Class D airspace ring that is published for Altus AFB. To allow routine, VFR departures, arrivals, and traffic patterns at Altus Quartz Mountain, a letter of agreement between Altus AFB and Quartz Mountain was developed. This LOA delegates a significant portion of the Altus AFB Class D controlled airspace to Quartz Mountain airport allowing operations to occur there without the standard Class D two-way communication requirement with the Altus control tower. In the absence of that two-way communications requirement and in addition to see-and-avoid, aircraft separation is attained laterally by confining the Altus-Quartz Mountain operations to the delegated airspace. Additionally, a 500-foot vertical separation is achieved by virtue of the difference between the Altus Quartz Mountain traffic pattern altitude (1000' AGL) and the Altus AFB traffic pattern altitude (1500'). As designed, the proposed Altus west pattern lies outside the airspace delegated to the general aviation airport by 1.6NM laterally and 500 feet vertically.	N/A
3	Mr. Chris Rausch	The separation distance between the west pattern and Quartz Mountain Airport is insufficient if a pilot loses situational awareness (Safety issue).	Similar to comment 2, above, the comment expresses concern about the adequacy of aircraft separation between aircraft operating from and in the vicinity of Altus Quartz Mountain airport and the airfield at Altus AFB. The west pattern is designed to remain outside the airspace delegated to the Altus Quartz Mountain airport by 1.6NM laterally and 500 feet vertically. It is not clear from this comment pertaining to a potential loss of situational awareness by a pilot whether that specifically concerns pilots of military aircraft operating from Altus AFB or pilots flying civilian aircraft operating from Altus Quartz Mountain airport. The two principal aircraft types that operate from Altus AFB and that would be the predominant types using the proposed west pattern crewed by at least two pilots and if on an instructional flight have a flight instructor aboard. The crew share the responsibility of maintaining situational awareness and the likelihood of all crew members losing situational awareness at the same time in VFR conditions is remote.	N/A
4	Mr. Chris Rausch	Previously there were C-141 and C-5 aircraft at Altus AFB and there was never a west pattern. Now that there are less flying operations the base feels a need to acquire more airspace	Text will be added to the Purpose and Need Section of Chapter 1 to explain why more airspace is needed.	Add to bullet list on page 1-1 - "Freedom to use Altus class D airspace to the field's west as another visual flight rules (VFR) pattern. Despite recent reductions of total wing flight time, the addition of a west pattern would help to address syllabus changes as well as alleviate congestion already existing in east VFR pattern."
5	Mr. Chris Rausch	Flying operations should decrease because more flying training is done in the simulators.	Recent technological advancements in simulator technology, high fuel cost, and environmental considerations have placed emphasis on simulator training across the Air Force. Here at Altus, those syllabi most affected by this change have increased in training days and events while actually decreasing in number of flights. While simulators are now used for training all the way through basic qualification, the weakness in landing simulation places immediate focus on obtaining as many landings as possible for each student on each of the now fewer sorties. The fast repetition of VFR patterns is essential to finalizing student training but results in VFR pattern saturation for aircraft currently here, with further complications perceived by other aircraft that may become part of the Altus inventory in the future.	N/A
6	Mr. Greg Camp	A west pattern at Altus AFB will create a safety issue requiring arriving/departing aircraft to change radio frequencies at least three times within a short period of time.	The ATC airspace at Altus consists of Class D airspace and Class E airspace. Within the Class D airspace, separation and sequencing services are primarily provided by the Altus AFB Tower. Outside of the Class D airspace, an optional Terminal Radar Service Area is charted and sequencing and radar advisory services are provided to pilots operating under VFR, if requested and if controller workload permits. Currently, aircraft departing VFR from Altus Quartz Mountain airport on a runway heading to the north or south, or to west are not required to contact Altus Tower air traffic controllers provided they remain within the Class D controlled airspace that is delegated to Altus Quartz Mountain airport (see Comment No. 2 above) and depart the Class D airspace to the west and then remain outside of the Class D airspace. The use of the TRSA radar advisories is optional. However, aircraft departing to the east currently are required to contact either Altus Tower controllers or the Altus Radar Approach/Departure controllers to coordinate an eastward transition over Altus AFB. The addition of a proposed west pattern at Altus AFB does not alter the airspace or the existing communications requirement, although it is likely that such eastward transitions might not be approved when the pattern is in use if adequate visual or procedural separation cannot be assured. The FAA Orders that govern how air traffic control services are rendered anticipate scenarios where different control facilities share responsibility for providing separation services, sequencing, and advisories (i.e., a control tower and an radar approach/departure control facility). If aircraft operating from Quartz Mountain remain within the delegated airspace while exiting the Class D airspace to the west, no two-way radio communications requirement exists and typically a single frequency change would occur (Altus Quartz Mountain UNICOM/CTAF) to Altus Departure control assuming TRSA services are requested. Alternatively, if departing to the east, establishment of two-way radio communications with the controlling agency (Altus ATC Tower) is required prior to entry as is the case currently. The minimum number of frequency changes required for arrivals/departures from/to the east would remain one (from UNICOM/CTAF to Altus Tower or vice-versa). Aircraft are not required to contact Altus Departure/Approach control unless requesting TRSA services. However, if approach/departure control is providing TRSA services for arrivals from the east and two-way communications between the pilot and Altus Approach/Departure control have been established, FAA Orders governing provision of air traffic control services indicate that pilots of aircraft are not expected to coordinate for entry into the Class D airspace and thus have to switch from Approach/Departure to the Tower. Rather, the approach controller coordinates (via land line) for the transition and the only one frequency change would typically be required, from Altus Approach to the CTAF/UNICOM.	N/A

No.	Commenter	Comment	Response	Text Change
7	Mr. Greg Camp	The west traffic pattern could cause problems with the Quartz Mountain traffic pattern in that the KC-135 cannot make the turn without extending almost into the Quartz Mountain traffic pattern.	(See no. 3) Aircraft on downwind are above airspace delegated to Quartz Mountain per the Letter of Agreement and separated laterally.	N/A
8	Mr. Greg Camp	Students training at Quartz Mountain can and will stray into Class D airspace.	Pilots are required by FAA regulation to establish two-way radio communications prior to entering Class D airspace. Unauthorized entry into controlled airspace can lead to suspension of a pilot's FAA certification. One potential means of mitigating this concern would be for Altus Quartz Mountain to consider revising its traffic patterns to remain west of their runway centerline (i.e., right traffic on south flows using Runway 17 at Altus Quartz Mountain).	N/A
9	Mr. Greg Camp	There is a safety factor from objects falling off the aircraft	Aircraft assigned to Altus AFB do not carry external objects on the aircraft (ie: Bombs, external wing tanks). The chance that a piece of the aircraft detaching from the aircraft during flight is minimal.	N/A
10	Mr. Greg Camp	Altus Quartz Mountain Airport is an important and vital economic tool for Altus as well as the base. If transit aircraft should find it difficult to get in and out of the airport it will have a negative effect on fuel sales as well as aircraft operations.	Transit aircraft arriving from the north, south, or west have access to the airspace delegated to Quartz Mountain without entering Class D airspace. Currently, civilian aircraft transitioning the Altus AFB Class D airspace to/from the east (having established two-way communications with the Altus AFB Tower or Altus Radar Approach/Departure Control) for a departure/arrival at Quartz Mountain are allowed to transition Class D airspace and given traffic advisories to assist in traffic separation. These procedures are used today in the absence of a west pattern and would remain subsequent to implementation of a west pattern. The west pattern should not increase the difficulty for a transient aircraft transitioning to the east of Altus Quartz Mountain.	N/A
11	Mr. Ben Bailey	The proposed west pattern will overlap Quartz Mountain's 45 degree entry into runway 17 downwind, placing heavy aircraft in close proximity to light aircraft.	Currently, civilian aircraft transitioning the Altus AFB Class D airspace from the east (having established two-way communications with the Altus AFB Tower or Altus Radar Approach/Departure Control) for a downwind entry into runway 17 currently are given traffic advisories to assist in traffic separation; however the primary responsibility for VFR separation remains with the pilot in command using "see and avoid". These procedures are used today in the absence of a west pattern and would remain subsequent to implementation of a west pattern. Aircraft transitioning from the north, south, or west within the Quartz Mountain delegated airspace should be able to maneuver into the downwind without entering Class D airspace as they currently do (See No. 2 and No. 6).	N/A
12	Mr. Ben Bailey	Even though the routes appear to be separated by one mile, the wake turbulence from heavy aircraft spreads and lingers and can upset light aircraft.	As with maintaining aircraft separation, awareness and avoidance of wake turbulence from other aircraft is the responsibility of the pilot in command. Wake turbulence, caused by wing-tip vortices, typically spreads out laterally and descends weakening with distance from the source aircraft. Windy conditions tend to dissipate the vortices more rapidly. A two- to three-minute separation between aircraft is typically required.	N/A
13	Mr. Ben Bailey	When using RWY 35 at both airports, there is a great chance that heavy aircraft will be very close to the departure path of aircraft from AXS with the potential for wake turbulence lingering in the departure path and head on traffic conflict.	See Comments 2 and 10, above.	N/A
14	Mr. Ben Bailey	In the occasional case when base traffic is using runway 35 and AXS is using runway 17, there would be a good possibility of head on traffic conflict.	As the commenter notes, it is not typical for Altus-Quartz Mountain airport and Altus AFB to operate with different flows. That is, runway selection is ordinarily determined by the winds with operations usually occurring into the wind; it would be extremely unusual for winds at one airfield to favor a north flow when winds at the other airfield favor a south flow. This scenario would be most likely during a period experiencing calm winds. Provided the aircraft operating from Altus Quartz Mountain airport remain within the delegated airspace or establish two-way communications prior to entering the non-delegated portion of the Class D airspace, VFR separation would be maintained through see-and-avoid. At other airfields in other parts of the country with similar airfield spacing and geometry, the publication of a right traffic pattern helps to address this concern by keeping the traffic pattern on the same side of the airfield, regardless of the flow of operations.	N/A
15	Mr. Ben Bailey	The heavies will be training student pilots and the west pattern becomes much wider than planned. This larger pattern would bring the heavies over a heavily populated area of the city that includes the high school, hospital, and churches.	The student pilots that train at Altus are already rated pilots - the training at Altus is transition training to mission aircraft (KC-135, C-17) as contrasted with training aircraft (T-6, T-1, T-38). Primary flight training occurs at other Air Force installations. Having said that, the Air Force recognizes that a flight track depiction is representative, a variety of factors influence the lateral displacement of a particular ground track on any given day and minor lateral variations could occur. Such circumstance may include avoiding weather or other traffic. This comment appears to be concerned principally with the effects of aircraft operations over populated areas. The principal effects would be minor changes to the noise setting; a more detailed analysis of the particulars are presented in the EA. That analysis and discussion indicates that the effects on selected nearby sensitive receptors (hospital, school) are minor. While the noise modeling results did not assess a lateral dispersion of operations along a flight track, dispersing the sources of noise would tend to lessen the cumulative noise value as the noise "doses" are no longer concentrated along a line.	N/A
16	Mr. Ben Bailey	My understanding is the west downwind is supposed to be over Veteran's Drive. During the test of the concept the turn radius of the KC-135 was shown to be too great to stay over the Veteran's Drive limit.	The test flight revealed that the turn radius was not feasible. However, there's ample separation from Quartz Mountain airport vertically and laterally.	N/A
17	Mr. Ben Bailey	Appropriate agencies were not contacted for this effort.	After receipt of Mr. Bailey's letter, copies of the Draft EA were mailed to the Altus Mayor, Altus City Council, Altus City Administrator, and the President of the Military Affairs Committee for their review. No comments were received. Additionally, one comment letter was received from the Airport Director.	N/A

Appendix B

Capability Analysis

General Plan-Based Environmental Impact Analysis Process
Capability Analysis

Altus Air Force Base

United States Air Force
Air Education and Training Command
97th Air Mobility Wing
Altus Air Force Base, Oklahoma

December 2008

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
agl	above ground level
AFI	Air Force Instruction
AICUZ	Air Installation Compatible Use Zone
AOC	Area of Concern
ASR	Airport Surveillance Radar
AT/FP	Antiterrorism/Force Protection
C&D	construction and demolition
cf	cubic feet
dB	decibel
DNL	Day-Night Average Noise Level
DoD	Department of Defense
ERP	Environmental Restoration Program
FAA	Federal Aviation Administration
FIX	Facility Infrastructure Examination
FY	Fiscal Year
hr	hour
Hz	hertz
IFR	Instrument Flight Rules
MFH	Military Family Housing
mgd	million gallons per day
msl	mean sea level
MWhr	megawatt-hours
N	North
NAAQS	National Ambient Air Quality Standards
NIA	Natural Infrastructure Assessment
OK	Oklahoma
PANCAP	Practical Annual Capacity
PAR	Precision Approach Radar
PHOCAP	Practical Hourly Capacity
QD	Quantity Distance
sf	square feet
TTSNS	Test and Training Space Needs Statement
UFC	Unified Facility Criteria
US	United States
USEPA	United States Environmental Protection Agency
VFR	Visual Flight Rules
W	West

No document text this page

CHAPTER 1
EXECUTIVE SUMMARY

The primary objective of this Capability Analysis is to determine the capacity for sustainable growth and development with respect to flying and non-flying mission elements at Altus Air Force Base (AFB), Oklahoma. The development potential presented in this report will be used to establish a potential development alternative to be assessed in the upcoming Installation Development Environmental Assessment.

For the non-flying mission, three primary resource areas were analyzed to quantify capacity to accommodate future growth and development: land-use/development, population/housing, and utility systems. In addition, other resource areas such as air emissions, solid waste, storm water collection, and socioeconomic resources were analyzed to determine if they could present a limiting factor for growth and development. The non-flying mission capability analysis is summarized below:

- Altus AFB consists of approximately 4,069 acres of land of which almost 3,396 acres are considered developed. Altus AFB land development headspace is considered to be 512.54 acres of developable land or approximately 13 percent of total land area.

- Altus AFB currently has 2,093 military personnel and dependents residing on base and has the capacity to house 3,524 personnel and dependents. This equates to an actual occupancy rate of 59 percent. The reported Altus AFB occupancy rate is 66 percent (Siens 2008a). In order to accommodate the Altus AFB mission, a certain number of dormitory units must be held available at any given time to house immediately incoming personnel. Therefore, the current reported housing occupancy rate of 66 percent is greater than the actual occupancy rate. Considering conceptual future housing capacity associated with land development, as well as planned construction, demolition, and renovation associated with Military Family Housing (MFH) privatization, Altus AFB has the future capacity to accommodate 4,092 on-base military personnel and dependents.

- The Altus AFB utility systems appear to be capable of accommodating any foreseeable installation development. Based upon current conditions, the potable water source for Altus AFB does not appear to be a limiting factor and the potable water system at the installation has the capacity to double production. This is the most limiting utility system at the installation; however, Altus AFB has the potential to increase existing infrastructure to support an additional increase in usage.

- The projected population growth rate under future installation development is 16 percent. Current excess housing capacity can provide lodging for initial population growth. Sufficient acreage is available on the installation for considered planned housing construction projects and conceptual future housing mentioned above to support an increase in population. Additionally, viewed as a positive impact to the

local community, socioeconomic resources could expand to accommodate the growth rate.

For the flying mission, aircraft noise, airfield capacity and airspace utilization were analyzed to quantify the capacity to accommodate future growth and development at the installation. The flying mission capability analysis is summarized below:

- As of 2008, approximately 159,336 annual aviation operations occur at Altus AFB. Using a limiting factor based on a two decibel noise level increase at sensitive receptors, Altus AFB would be capable of supporting approximately 247,520 annual operations. This represents a capacity to increase flying operations by approximately 57 percent.

- Based on the Practical Hourly Capacity metric for determining airfield throughput, the theoretical maximum capability of the Altus AFB airfield is approximately 388,800 annual operations. This represents a capacity to increase flying operations by approximately 144 percent.

- With respect to capacity to accommodate future aircraft operations, noise represents the most limiting constraint. Based on current utilization rates, Altus AFB airspace would require a test and training space needs statement to determine whether designation of additional special use airspace would be warranted.

CHAPTER 2
NON FLYING MISSION CAPABILITY

2.1 LAND-USE ANALYSIS

2.1.1 Methodology and Background

This section analyzes the capability of Altus AFB facilities and infrastructure to expand into undeveloped areas of the installation. This section utilizes the same methodology as contained in the 2008 *Natural Infrastructure Assessment* (NIA) for determining developable land on the installation considering various land-use compatibility and environmental constraints. The 2008 NIA served as the baseline for determining the distribution of land-use categories and characterizing the intensity of existing development on the installation. The information from the baseline analysis was then "projected" onto developable land providing a snapshot of the growth potential of the installation. It was assumed that no additional land acquisition would occur; therefore, maximum development was limited by land available within the existing installation boundaries.

2.1.2 Analysis of Existing Land-use

The current land-use plan is shown in Table 2-1. The current land-use map for Altus AFB is shown in Figure 2-1.

Table 2-1 Altus AFB 2006 Current Land-use Plan

Land-use Category	Area (Acres)	Percent of Total Land
Administrative	23.73	0.58%
Aircraft Operations and Maintenance	105.01	2.58%
Airfield	2309.60	56.76%
Community Commercial	44.80	1.10%
Community Service	27.13	0.67%
Housing Accompanied	295.28	7.26%
Housing Unaccompanied	38.37	0.94%
Industrial	158.10	3.89%
Medical	11.98	0.29%
Open Space	672.64	16.53%
Outdoor Recreation	327.07	8.04%
Training	55.27	1.36%
Total	**4,068.97**	**100.0%**

Source: (USAF 2008a)
Notes:
-Airfield Pavements and Airfield land-use categories as shown on the map from the 2003 General Plan - *Altus Air Force Base, Oklahoma* were combined into a single Airfield land-use category.

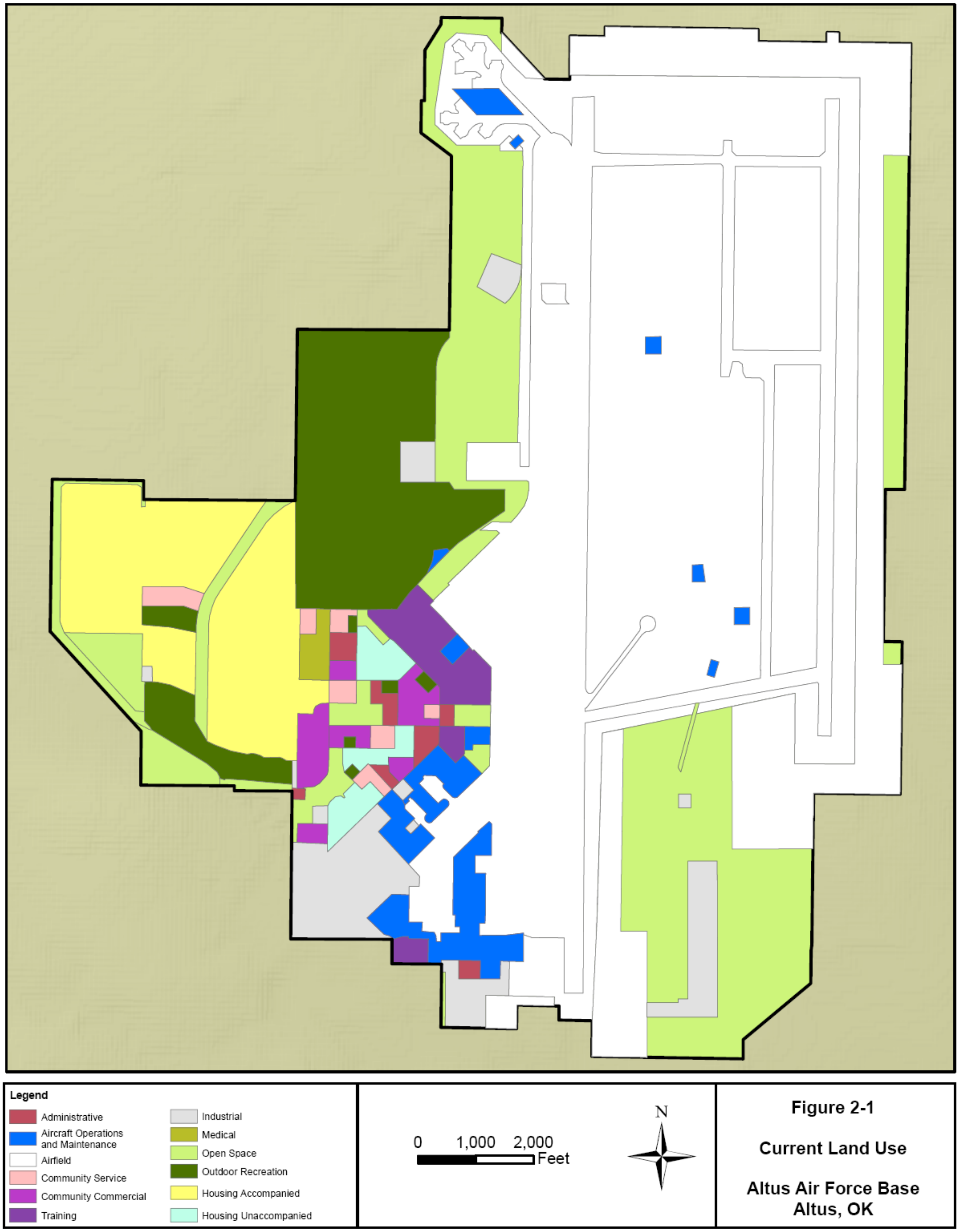

Figure 2-1

Current Land Use

Altus Air Force Base
Altus, OK

Based upon Table 2-1 and Figure 2-1, approximately 16 percent of Altus AFB is classified as Open Space. Additional analysis is shown in Table 2-2, characterizing the intensity of existing development on Altus AFB.

Table 2-2 Existing Development Intensity Metrics

Land-use Category	Developed Area[(1)] (Acres)	Existing Impervious Cover[(2)] (Acres)	Existing Facility Space[(3)] (SF)
Administrative	23.73	7.66	147,309
Aircraft Operations and Maintenance	105.01	33.76	721,466
Airfield	2309.60	520.32	599
Community Commercial	44.80	14.16	219,403
Community Service	27.13	7.83	54,764
Housing Accompanied	295.28	91.50	134,9136
Housing Unaccompanied	38.37	11.13	37,5758
Industrial	158.10	25.80	427,774
Medical	11.98	3.81	128,458
Outdoor Recreation	327.07	8.60	38,213
Training	55.27	16.27	547,223
Total	**3,396.33**	**740.84**	**4,010,103**

Notes:
(1) All land-uses other than Open Space are considered developed land-uses.
(2) Existing Impervious Cover calculated via facility and infrastructure footprint as shown on existing land-use map
(3) Existing Facility Space calculated via Air Force Form 7115 Real Property Data (USAF 2007a)

SF – square feet

2.1.3 <u>Determination of Developable Land</u>

The methodology for determining developable land on Altus AFB was based upon the 2008 NIA and involves a comparative analysis of undeveloped areas on Altus AFB with various development constraints. For the purposes of this analysis, it is helpful to define the following terms:

<u>Developed Land:</u> All existing land area that is classified as any land-use other than Open Space is considered to be Developed Land. Per Table 2-2, Altus AFB has approximately 3,396 acres of Developed Land. The 2008 NIA further classifies land areas with known land-use compatibility constraints, such as Safety Quantity-Distance (QD) Arcs and Airfield Clear Zones, as developed. For the purposes of this analysis, areas with these restrictions are included in the development constraints analysis below as opposed to the Developed Land area.

<u>Undeveloped Land:</u> All land area that is classified as Open Space is considered Undeveloped Land. Per Table 2-1, Altus AFB has approximately 673 acres of Undeveloped Land.

<u>Constrained Land:</u> Seven possible constraints to land development were considered as a part of this analysis. These constraints can be divided into two general categories; land-use

compatibility and environmental. Land-use compatibility constraints include: Safety QD Arcs, Small-Arms Range Safety Zones, Airfield Clear Zones, and a 150-foot antiterrorism/force protection (AT/FP) buffer zone along the installation perimeter. Environmental constraints include areas designated as wetlands or within the 100-year floodplain and Environmental Restoration Program (ERP) sites and Areas of Concern (AOCs). As indicated in the 2008 NIA, existing constraints can occur in both developed and undeveloped areas. Table 2-3 presents the results of the development constraints analysis for Altus AFB. A map of the development constraints on Altus AFB is found in Figure 2-2.

Table 2-3 Summary of Development Constraints

Constraint	**Total Area Constrained (Acres)**	**Constrained Land in Developed Land-uses (Acres)**	**Constrained Land in Undeveloped Land-uses (Acres)**
AICUZ	635.31	632.87	2.44
QD Arcs	423.10	423.10	0.00
ATFP	230.20	145.69	84.51
Floodplains	477.23	404.08	73.15
Wetlands	0.39	0.39	0.00
ERP Sites and AOCs	24.76	24.76	0.00
TOTAL	**1,790.99**	**1,630.89**	**160.10**

AICUZ – Air Installation Compatible Use Zone
AOC – Area of Concern
AT/FP – Antiterrorism/Force Protection
ERP – Environmental Restoration Program
QD – Quantity-Distance

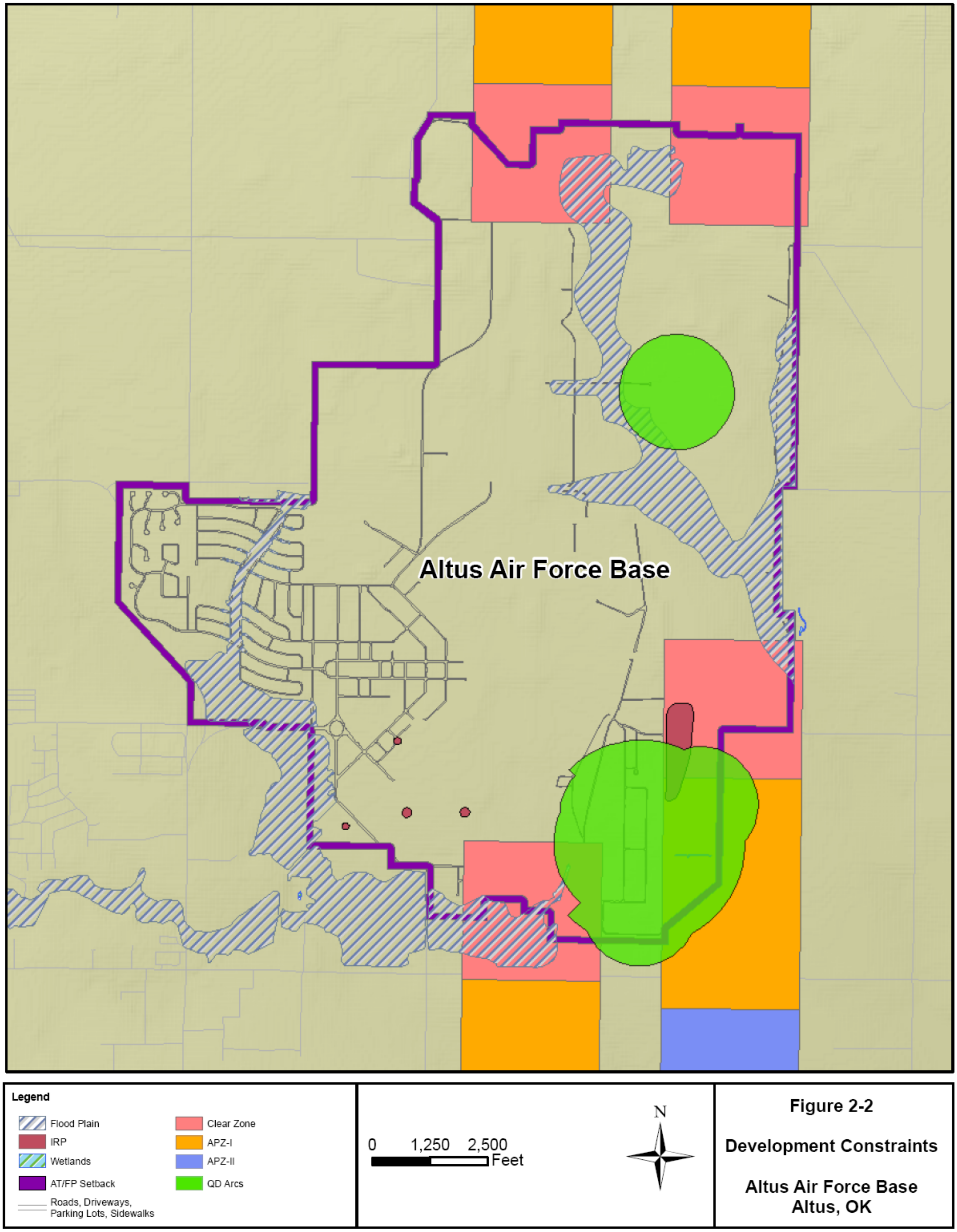

Figure 2-2

Development Constraints

Altus Air Force Base
Altus, OK

Developable Land: Per the 2008 NIA, Altus AFB Developable Land is defined as undeveloped land that is not subject to the development constraints listed above. While the various development constraints present on Altus AFB do not preclude all types of development on constrained land, the abundance of unconstrained open space allows the land development model for Altus AFB to focus on unconstrained open space. Table 2-4 presents the results of the overall developable land analysis for Altus AFB. Developable Land is also shown on an installation map in Figure 2-3.

Table 2-4 Developable Land on Altus AFB

Land Category	Acres
Total Installation Land (1)	4,068.97
Developed Land (2)	3,396.33
Undeveloped Land (3)	672.64
Undeveloped Land with Constraints (4)	160.10
Developable Land	**512.54**

Notes:
(1) From Table 2-1
(2) From Table 2-2
(3) Reflects existing Open Space From Table 2-1
(4) From Table 2-3

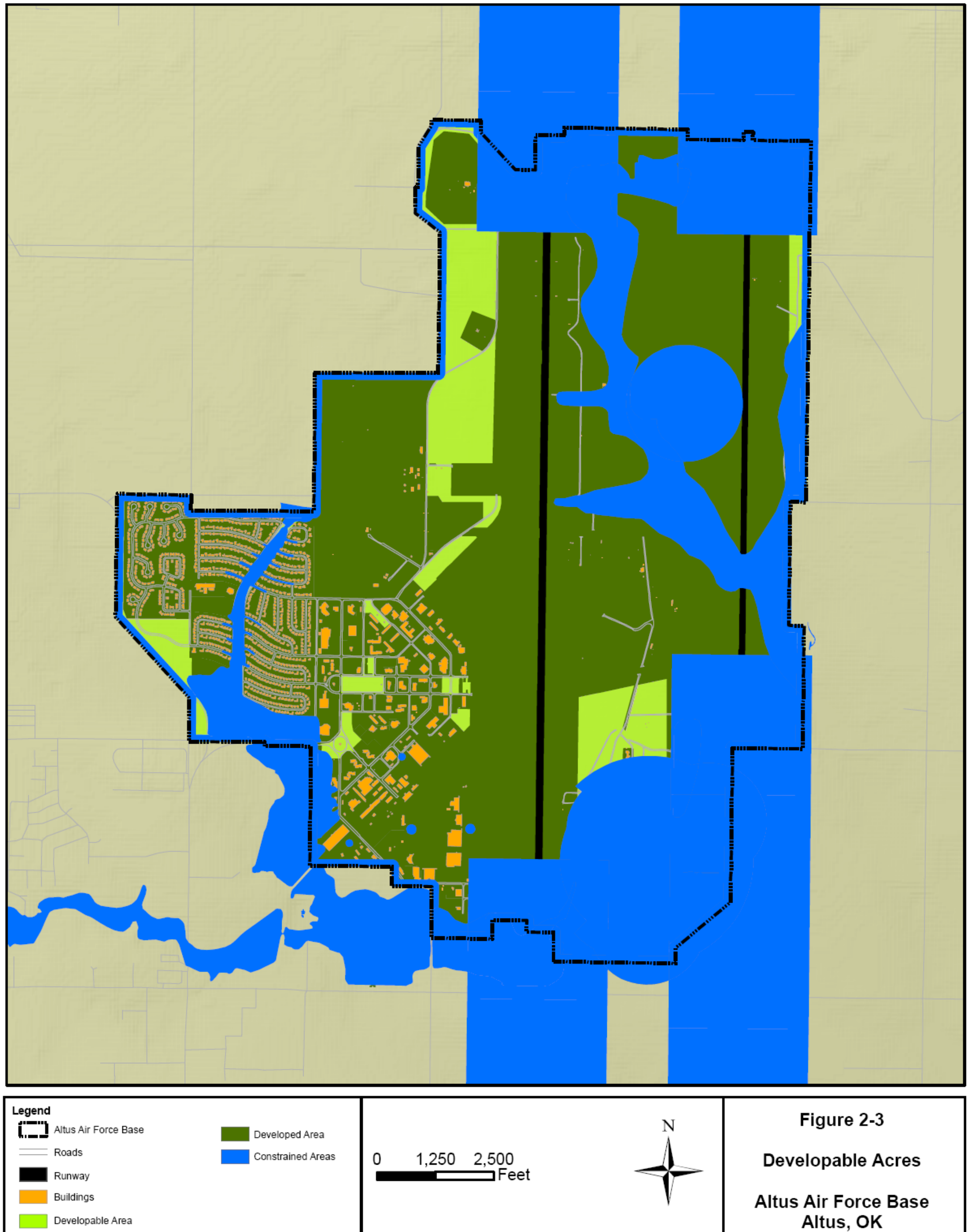

Figure 2-3

Developable Acres

Altus Air Force Base
Altus, OK

2.1.4 Future Land Development

In the 2003 *Altus AFB General Plan* (General Plan) calls for redistribution of 199.3 developable acres of open space to other land-use categories. The majority of redistribution occurs as a large expansion of the 'Airfield' and 'Aircraft Operations and Maintenance' land-uses. Slight decreases in acreage are planned for 'Community-Service,' 'Housing-Accompanied,' 'Industrial,' 'Outdoor Recreation,' and 'Training' land-uses. In the 2003 General Plan there are plans for future development of an additional 158.94 acres outside of the current installation boundary. This Capability Analysis only considers future projected changes to land-use within the current installation boundary. Additionally, to consider the maximum amount of future development possible, the remaining 313.24 acres of developable open space at Altus AFB were distributed across all developed land-use in a manner consistent with the existing allocation. Table 2-5 shows the future land-use distribution for Altus AFB based upon the existing allotment and land-use changes described in the 2003 General Plan. Figure 2-4 shows the future land-use map for Altus AFB.

Table 2-5 Future Land-use Distribution

Land-use Category	Current Land-use Area (Acres)	Land-use Area Added/(Subtracted) (Acres)	Future Land-use Area (Acres)
Administrative	23.73	7.5	31.18
Aircraft Operations and Maintenance	105.01	106.0	211.03
Airfield	2309.60	338.4	2648.04
Community Commercial	44.80	4.2	49.02
Community Service	27.13	1.8	28.96
Housing Accompanied	295.28	27.2	322.44
Housing Unaccompanied	38.37	8.7	47.07
Industrial	158.10	11.0	169.13
Medical	11.98	1.1	13.11
Open Space	672.64	-512.5	160.10
Outdoor Recreation	327.07	19.2	346.27
Training	55.27	-12.6	42.62
Total	**4068.97**	**0.0**	**4,068.97**

Source: (USAF 2003)
Notes:
-Airfield Pavements and Airfield land-uses as shown on General Plan maps were combined into a single Airfield land-use.
-Water land-use as shown on the General Plan maps was included in Outdoor Recreation land-use.

Table 2-5 reflects development of approximately 512.54 acres of Open Space (as shown in Table 2-4) available on the installation. This includes development of 100 percent of the developable Open Space acreage while considering development planned in the 2003 General Plan. An *Altus AFB 2030 Plan* outlined in the General Plan provides a description of the proposed changes in

land-use at Altus AFB. Future development of Altus AFB proposed in the 2003 General Plan includes actions such as:

a) Creating a new Wing Headquarters to be sited at the west end of the parade ground, creating hierarchy for base development, enhancing quality of space, and centralizing base functions.

b) Consolidating the Air Mobility Training Campus to bring all student housing into one area within walking distance of all flying training facilities. This consolidation would focus on circulation, accessibility, and sustainability.

c) Removal of substandard unaccompanied housing facilities located northeast of the traffic circle. A world-class, centrally located, recreation campus would be developed to include new facilities such as tennis courts, softball fields, football field and running track, volleyball courts, basketball courts, check-out facility, and bathrooms.

d) The North Ramp Expansion Plan would extend the north ramp by adding 110,000 square-yards of paving for parking 18 C-17s, as well as parking for the National Aeronautics and Space Administration 747 with its space shuttle. Also, two, two-bay aircraft hangars and a Consolidated Aircraft Maintenance Unit and Supply Facility would be constructed to support the new ramp.

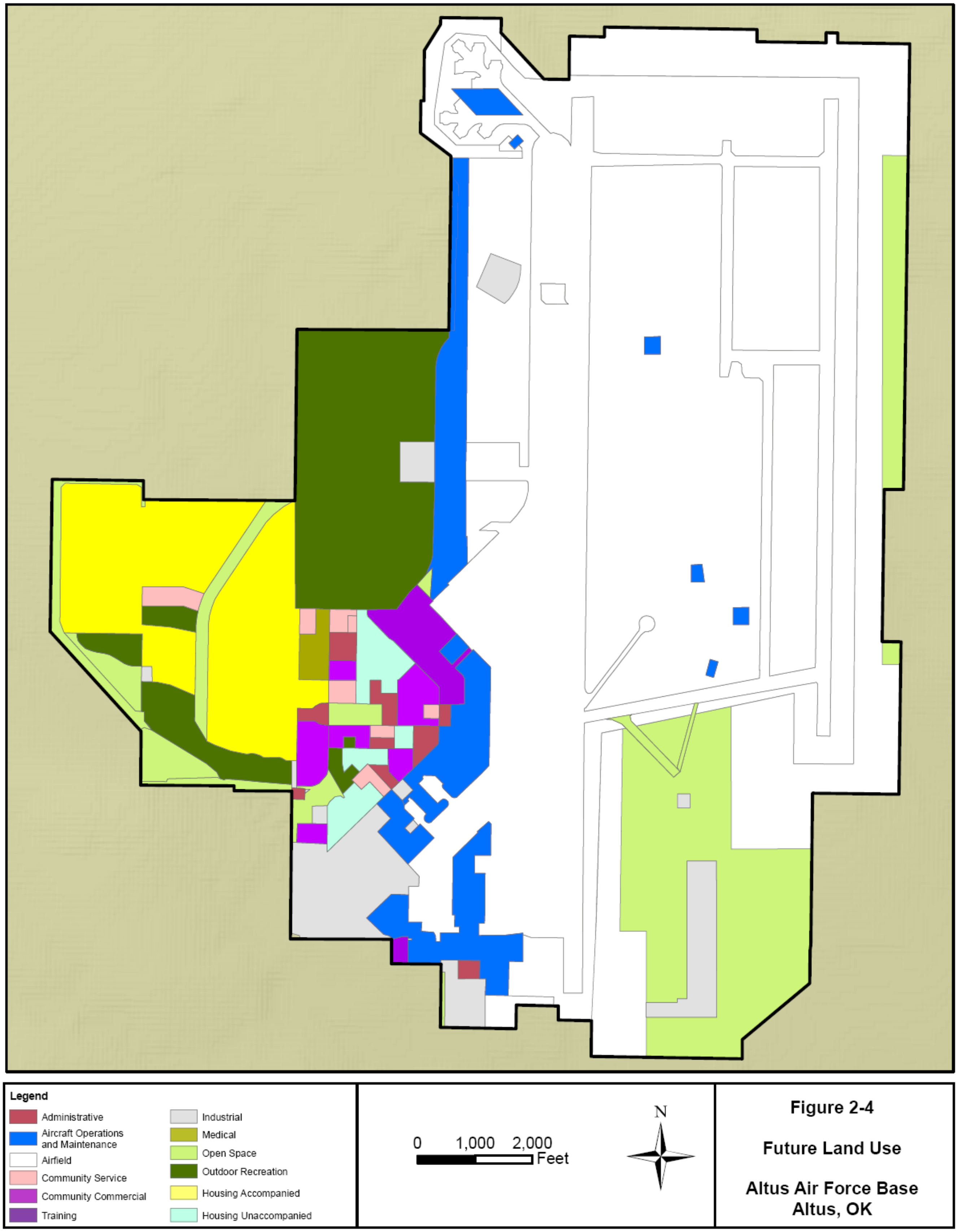

Figure 2-4

Future Land Use

Altus Air Force Base
Altus, OK

Table 2-6 presents current installation development factors for each land-use category based on the existing development intensity found in Table 2-2.

Table 2-6 Installation Development Factors

Land-use Category	Distribution of Future Development Across Land-uses(1)	Impervious Cover Density Factor(2)	Facility Space Density Factor(3)
Administrative	0.70%	32.30%	14.25%
Aircraft Operations and Maintenance	3.09%	32.15%	15.77%
Airfield	68.00%	22.53%	0.00%
Community Commercial	1.32%	31.61%	11.24%
Community Service	0.80%	28.87%	4.63%
Housing Accompanied	8.69%	30.99%	10.49%
Housing Unaccompanied	1.13%	29.01%	22.48%
Industrial	4.66%	16.32%	6.21%
Medical	0.35%	31.79%	24.62%
Open Space			
Outdoor Recreation	9.63%	2.63%	0.27%
Training	1.63%	29.44%	22.73%

Notes:
(1) Based on distribution of developed land-uses in current land-use plan as found in Table 2-5.
(2) Impervious Cover Density Factor equals existing impervious cover area in each land-use category (acres) divided by the area of each land-use category (acres) as found in Table 2-2.
(3) Facility Space Density Factor equals existing facility space in each land-use category (acres) divided by the area of each land-use category (acres) as found in Table 2-2.

Using the Impervious Cover and Facility Space Density Factors shown in Table 2-6, the projected additional impervious cover and facility space for the development model is shown in Table 2-7.

Table 2-7 Project Impervious Cover and Facility Space for Maximum Development

Area of New Land Development [1] (Acres)	Additional Impervious Cover[2] (Acres)	End State Impervious Cover[3] (Acres)	Additional Facility Space[4] (SF)	End State Facility Space[5] (SF)
512.54	124.48	865.33	927,384.36	4,937,487.36

Notes:
(1) See Table 2-4
(2) Based on application of Impervious Cover Density Factors (Table 2-6) to projected land development in each land-use category
(3) Assumes current impervious cover of 740.84 acres per Table 2-2
(4) Based on application of Facility Space Density Factors (Table 2-6) to projected land development in each land-use category
(5) Assumes current facility space of 4,010,103 SF per Table 2-2
SF – square feet

2.1.5 Summary and Discussion

Altus AFB consists of approximately 4,069 acres of land of which, approximately 3,396 acres are considered developed. Altus AFB land development headspace is considered to be approximately 512 acres of developable land or about 13 percent of total land area. The maximum land development capability for Altus AFB involves development of 100 percent of developable land to include construction of an additional 124 acres of impervious cover and 0.93 million square feet of additional facility space.

2.2 POPULATION AND HOUSING EVALUATION

2.2.1 Methodology and Background

This section analyzes the capability of Altus AFB to accommodate increases in permanent party personnel, primarily from the stand point of on-base housing facilities. The current housing inventory for both accompanied and unaccompanied personnel served as the baseline for this analysis. For this analysis, MFH is considered to be on-base, although it has been privatized. Maximum development for this resource area was limited by the amount of additional housing that could be constructed on the installation. Future housing options considered in this analysis include both housing construction projects contained in the 2003 General Plan and conceptual housing construction that was derived from the expansion of the Unaccompanied and Accompanied Housing land-use areas in Section 2.1

2.2.2 Current Population Analysis

The current population of Altus AFB, based on the Fiscal Year 2007 *Altus Air Force Base Economic Impact* report (USAF 2007b) and information collected from Altus AFB personnel (Siens 2008b and Bellon 2008), is shown in Table 2-8.

Table 2-8 2007 Population of Altus AFB

Category	Living On-base	Living Off-base	Total
Active Duty Military(1)	803(2)	600	1,403
Civilian Personnel	10	2,421	2,431
Military Dependents	1,280	0	1,513
Total	**2,093**	**3,254**	**5,347**

Source: (USAF 2007b, Siens 2008b, and Bellon 2008)
Notes:
(1) Includes Active Duty Reservists and Trainees
(2) Includes Privatized Housing

Undergraduate pilot training students at Altus AFB are not considered permanent party personnel and on a daily basis approximately 588 students are in training at Altus AFB. Since these students rotate on- and off-base as new training schedules begin, these students were counted once in the on-base population for the year.

For the purposes of analyzing Altus AFB utility systems, an effective population metric has been developed providing a more accurate representation of the effective 24-hour population that installation utility systems must support. Under this metric, Altus AFB personnel who live off-base are weighted by a factor of one-third to represent their average 8-hour per day demand on installation utilities. Table 2-9 provides the effective population summary for Altus AFB.

Table 2-9 2007 Altus AFB Effective Population

Category	Population	Effective Population Factor	Effective Population
On-Base Personnel (24-hr population)	2,093	1.00	2,093
Off-Base Personnel (8-hr population)	3,254	0.33	1,074
Total	**5,347**	**--**	**3,167**

hr – hour

2.2.3 Current Housing Capability

Existing population on Altus AFB was also characterized by a bedspace analysis across available types of housing. Table 2-10 presents a bedspace analysis for Altus AFB as it applies to military members only.

Table 2-10 2008 Bedspace Analysis for Military Members

Housing Facilities	Capacity (persons)	Average Occupancy Rate	Expected Population (persons)
Building 315 (Dormitory)	76	56%	43
Building 316 (Dormitory)	76	0%	0
Building 331 (Dormitory)	102	82%	84
Building 333 (Dormitory)	102	0%	0
Building 335 (Dormitory)	102	80%	82
Building 213 (Dormitory)	96	82%	79
Military Family Housing Units	770	75.8%(1)	584
Total	**1,324**	**--**	**872**

Source: Siens 2008a
Note:
(1) Source: Siens 2008b

From Table 2-10, Altus AFB has a current military member housing capacity, including privatized military family housing, of 1,324. Based upon reported occupancy rates, approximately 872 members reside in these units. In order to accommodate the Altus AFB mission, a certain number of dormitory units must be held available at any given time to house immediately incoming personnel. As a result, housing occupancy rates appear to be higher than current on-base population. Therefore, for the purpose of estimating available units, these "set-aside" units will be considered occupied. Approximately 66 percent of available housing capacity is considered occupied at Altus AFB.

Table 2-11 expands on the existing bedspace analysis to include military dependents residing on-base.

Table 2-11 2008 Bedspace Analysis for On-Base Residents

Bedspace Type	Military	Dependent
Accompanied Housing		
Military Family Housing Units	770	2,200(1)
Unaccompanied Housing		
Dormitories	554	0
Total Current Housing Capacity	**1,324**	**2,200**
Total	**3,524**	

Notes:
(1) MFH Dependent bedspace based on existing MFH inventory of 211, 2-Bedroom; 458, 3-Bedroom; and 101, 4-Bedroom units (Siens 2008a). Assuming one bedroom per military member and spouse and one bedroom per dependent child, the dependent capacity in MFH is approximately 2.86 times the military member capacity.

2.2.4 Future Housing Capability

Based upon existing MFH occupancy rates and the current installation population, the overall MFH inventory at Altus AFB is expected to be reduced in the near term as a part of privatization.

Additional changes to Altus AFB housing as part of the MFH privatization include demolition, renovation, consolidation and construction of MFH units. According to the *Altus AFB MFH Privatization Environmental Analysis (2000)*, the end state of MFH will be 726 units, and privatization activities began in FY05 and will be completed by FY10 (USAF 2004a). Privatization will result in the overall reduction in MFH of 239 units from the original inventory of 965 units, and a reduction of 44 units from the current inventory.

The Land-use Development analysis found in Section 2.1 provides a conceptual model for growth of the Unaccompanied and Accompanied Housing land-uses on Altus AFB. As the developed area of the installation grows, the proportional growth model suggests that Altus AFB housing capability will grow as well. Using the Facility Space Density Factors, a projection of future housing facility space was made for the Unaccompanied and Accompanied land-use areas. Facility planning factors were then used to correlate new housing construction to additional bedspace for military members and dependents. Table 2-12 shows the future bedspace analysis based on the proportional growth model presented in Section 2.0.

Table 2-12 Future Bedspace Analysis for On-Base Residents

	Conceptual Housing New Construction(1) (SF)	**Gross Area per Person (SF)**	**Total Additional Personnel(4)**
Accompanied Housing	164,269	425(2)	387
Unaccompanied Housing	96,411	532(3)	181
Total Housing	**260,680**	**957**	**568**

Notes:
(1) Per Table 2-6, approximately 10 percent and one percent of new land development would be Accompanied Housing and Unaccompanied Housing, respectively. Conceptual New Housing Construction numbers were developed by multiplying the amount of new land development for each housing type area by the Facility Space Density Factor for that type of housing.

(2) Table 4-1 – *MFH Unit Size Standards* from the *US Air Force Family Housing Guide for Planning, Programming, Design, and Construction* (USAF 2004b) was used to derive an average gross area per person based on benchmark gross SF allowed across all grades and bedroom requirements for new MFH construction.

(3) An average was taken between the gross area per person for grades E1-E6 (355 SF) and grades O1-O3 (710 SF) as found in the *US Air Force Unaccompanied Housing Design Guide* (USAF 2006).

(4) Because Accompanied Housing gross area per SF factors include all residents, personnel numbers presented here include both military and dependents.

MFH – Military Family Housing
SF – square feet
US – United States

2.2.5 Summary and Discussion

Altus AFB currently has capacity to house approximately 1,324 military members and 2,200 dependents for a total of 3,524 persons. The most recent occupancy numbers indicate that the

installation is at approximately 66 percent of its current housing capability. The land development model presented in Section 2.1 projects approximately 260,680 square feet of new housing construction. This translates to bedspace for 568 additional personnel and dependents with a total potential housing capability of up to 4,092 persons in the Accompanied and Unaccompanied Housing Areas. This is a 16% increase in bedspace over current conditions.

2.3 UTILITY SYSTEMS EVALUATION

2.3.1 Methodology and Background

This section analyzes the ability of Altus AFB utility systems to accommodate future growth and development of the installation. At the on-set of this process, it was determined that Altus AFB faces no constraints with respect to accommodating future growth within this resource area. A synopsis of each utility system along with an analysis of each system's capability to accommodate growth development is provided below.

2.3.2 Potable Water

Potable water for Altus AFB is provided by the City of Altus. The Tom Steed Reservoir is the primary water source for the City of Altus, the Quartz Mountain Reservoir and groundwater act as secondary sources. The City of Altus has the capacity to treat 11.25 million gallons per day (mgd) (AETC 2008). Fiscal Year (FY) 2007 water consumption at Altus AFB was approximately 148 million gallons or approximately 0.41 mgd (USAF 2008a). The City of Altus has a contract in place with Altus AFB designating the maximum water consumption, for Altus AFB, that cannot exceed 375 million gallons per year or (1.03 mgd) (AETC 2003). For FY 2007, Altus AFB utilized approximately forty percent of its annual contracted water supply. Based upon the available annual headspace of 227 million gallons per year, Altus AFB could more than double its potable water usage without exceeding its agreement with the City of Altus.

The 2003 General Plan classifies the Altus AFB water distribution system as "yellow" using the Facility Infrastructure Examination (FIX) system. A yellow designation states that the system is mission capable, but requires major repair or an upgrade within five years of the designation. The distribution system including distribution lines, mains, service lines are considered to be in good condition and will require moderate updating/construction to ensure future use and capability. In addition, the storage tanks are considered to be in fair condition (AETC 2003).

The Altus AFB water system appears to be capable of accommodating any foreseeable installation development assuming that the storage and distribution systems are improved and expanded, and that the potable water usage is below the City of Altus contracted limit. The potable water supply would not be a limiting factor for development.

2.3.3 Wastewater

Altus AFB utilizes the City of Altus utilities for its sanitary sewer services and does not operate any wastewater treatment facilities. Altus AFB discharges to the City of Altus Wastewater Treatment Plant under the City of Altus Industrial Pretreatment Wastewater Discharge Permit.

The plant's daily treatment capacity is 4 mgd with a peak daily flow of discharge of 0.8 mgd (AETC 2008). In FY 2007, Altus AFB discharged approximately 148 million gallons or 0.4 mgd of wastewater (USAF 2008a). The average overall discharge to the City of Altus Wastewater Treatment Plant, including discharge from Altus AFB, is 1.2 to 2.3 mgd. Based upon these numbers, the City of Altus Wastewater Treatment Plant, has a headspace of 1.7 MDG. Altus AFB could potentially increase discharge to the system by more than two times without jeopardizing the available headspace.

The 2003 General Plan classifies the Altus AFB sanitary sewer system as "red", using the FIX system. This rating indicates that the system is in poor condition and requires repair or replacement. Approximately 52-percent of the sanitary sewer lines need to be replaced or repaired; much of the piping has been disintegrated, leaving behind open underground voids (AETC 2003). Wastewater treatment for Altus AFB would be capable of accommodating substantial additional installation development; however the development would be limited based upon the rehabilitation of the sanitary sewer system lines. Once lines have been repaired or replaced and additional lines constructed to accommodate additional development, the sanitary sewer system would be capable of accommodating additional installation development.

2.3.4 Electrical System

Western Farmers Electric Cooperative supplies and regulates electrical service to Altus AFB from a 69 kilovolt transmission line that enters the base on the south side of the base. The transmission line enters the base at a substation, where the electricity is distributed to six circuits that distribute power throughout Altus AFB (AETC 2003). Total electrical consumption for FY 2007 was approximately 63,369 megawatt-hours (MWhr)-or approximately 0.5 MWhr per day (USAF 2008a). The electricity provider has the capacity to produce 1,054 MWhr per day (AETC 2003). Altus AFB utilized less than one percent of the electricity provider's generation capacity. Based upon the capability of the electric provider, the electrical demand is not a limiting factor for development at Altus AFB.

The 2003 General Plan classifies the Altus AFB electrical system as "yellow" based upon the FIX system. This rating indicates that the system is mission capable, but requires major repair or upgrade within five years of the designation. Based upon the generation capacity and Altus AFB electricity usage, the system appears to be capable of accommodating any foreseeable installation development assuming that storage and distribution systems are improved and expanded accordingly. There are no indications that electrical supply to the installation would represent a limiting factor for installation growth and development.

2.3.5 Natural Gas System

Natural gas is supplied to Altus AFB by CenterPoint Energy (USAF 2005). The natural gas enters the base through an 8-inch buried coasted steel pipe located near the southwest boundary of the installation (AETC 2003). The natural gas distribution system consists of polyethylene plastic lines with a design capacity of 134,000 cubic feet (cf) per hour (USAF 2005). FY 2007 on-base usage was approximately 193,912,000 cf. The average daily demand was approximately 531,000 cf and the peak average daily demand occurred during the month of January, with a use

of 1,519,000 cf per day (USAF 2008a). Based upon these numbers, natural gas usage can multiply three fold, given the peak daily average.

The 2003 General Plan classifies the Altus AFB natural gas distribution system has "yellow" based upon the FIX system. A yellow designation states that the system is mission capable, but requires major repair or upgrade within five years of the designation. The distribution system including distribution lines, mains, service lines are considered to be in good condition and will require moderate updating/construction to ensure future use and capability. The main lines within the Capehart and Great Plains Family Housing are considered to be in excellent condition (AETC 2003).

2.3.6 Summary and Discussion

From a resource capability standpoint, the Altus AFB utility systems would not represent a limiting factor for development as presented in this document. Assuming the necessary improvements to installation utility infrastructure would be executed in conjunction with development efforts on Altus AFB, all utility resources have excess capacities that exceed the development capability for land and population growth.

2.4 ADDITIONAL RESOURCE OVERVIEWS

2.4.1 Methodology and Background

This section addresses additional individual resource areas that could represent limiting factors for development at an Air Force installation. Rather than developing specific capacities for these resources, they are evaluated as to whether or not they would represent a limiting factor for development at Altus AFB.

2.4.2 Air Emissions

Altus AFB, located in Jackson County is currently classified as attainment for all criteria pollutants under the National Ambient Air Quality Standards (NAAQS) (USAF 2008a). Altus AFB has one minor source operating permit issued by the Oklahoma Department of Environmental Quality. Based on 2007 Air Emissions data, Altus AFB operates at approximately eight percent of its permitted emissions limits based on an average across all stationary emission sources and using criteria pollutants. The closest any single emissions source comes to its permitted limit is Nitrogen Oxides from stationary fuel combustion sources where 8.08 tons per year of Nitrogen Oxides were emitted against a 40 tons per year limit (20 percent of allowable) (USAF 2008a). While the United States Environmental Protections Agency (USEPA) established a more stringent standard for ozone in March 2008, USEPA emissions data for 2004-2006 shows that Jackson County has been below the new standard. USEPA does not predict Jackson County will be non-attainment. Assuming Jackson County remains in attainment for NAAQS, air emissions would not be expected to be a limiting factor for future development at Altus AFB.

2.4.3 Solid Waste

All municipal solid waste generated at Altus AFB is collected and transported by a local contractor. This waste is currently disposed of at the City of Altus Landfill, approximately 13 miles from Altus AFB. With a disposal area of approximately 420 acres, the City of Altus Landfill accepts approximately 36,104 tons of solid waste annually, including construction and demolition (C&D) waste. The City of Altus Landfill does not keep records of the total amount of C&D waste accepted annually (Combs 2008). Currently, the landfill has utilized 25 acres of the 420 acres of available land. Altus AFB disposed of 593.49 tons of solid waste to the City of Altus Landfill in FY 2007 representing approximately two percent of the overall solid waste handled by the landfill (Combs 2008). Therefore, solid waste disposal would not represent a limiting factor for development of Altus AFB in the near term.

2.4.4 Socioeconomics

While the majority of this study is focused on the capability of existing resources on Altus AFB to accommodate increased installation development, it is important to note the role of the local community in the development potential for the base. Development of Altus AFB would rely, in part, on the capability of the local community with respect to off-base housing, education, workforce, and economic infrastructure. While generally, these capabilities can be considered elastic, in that the local community capability would likely expand to meet new requirements, it is possible that installation development could overwhelm the local community in the short-term.

The Oklahoma Department of Commerce has projected the population of the City of Altus to increase by 14.4 percent from 2005 to 2030 with an approximate 2.72 percent increase every five years (Oklahoma Department of Commerce 2008). The future development scenario could result in a minimal impact to the local community with respect to socioeconomic issues.

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CHAPTER 3
FLYING MISSION CAPABILITY

3.1 METHODOLOGY AND BACKGROUND

This section assesses the ability of Altus AFB to absorb additional flying activities and its capacity to increase its flying mission. The assessment considers three factors: (1) predicted noise exposure in the immediate vicinity of the airfield, (2) physical and operational constraints of the airfield and runway complex that limit the throughput of aircraft operations, and (3) the capacity and availability of training airspace for use by additional flying missions based at Altus AFB.

This assessment compares two operational intensities or states. First, a current baseline condition, which for this report is the level of operations modeled for Fiscal Year 2008; and second, a theoretical increase in the level of operations that would represent a maximum level of aircraft operations at Altus AFB. The amount by which flying operations could be increased at Altus hinges upon three principal variables:

- the existing and potential predicted noise exposure in the vicinity of the airfield;
- the capacity of the existing built infrastructure to accommodate an increase; and,
- the capacity of the natural infrastructure, in this case training airspace, to absorb additional utilization.

Each of these variables, while interrelated to the other two, ultimately becomes a limiting factor on the level of flying operations distinct from and independent of the other two. The variable with the least excess capacity to absorb additional flying activity sets a theoretical maximum level of activity for the installation's flying mission. The metrics described below for these three elements (noise, airfield throughput, and airspace capacity) are used to assess capacity to increase flying operations.

3.1.1 Methodology

For predicted noise exposure, the limiting factor is established in the Air Force's Air Installation Compatible Use Zone (AICUZ) program as outlined in Air Force Instruction (AFI) 32-7063 *Air Installation Compatible Use Zone Program* dated 13 September 2005. While the intensity of aircraft operations fluctuates over time for a variety of reasons, AFI guidance indicates that a proposed action (such as a beddown) that would result in a change in operations triggering a two decibel (dB) increase in the Day-Night Average Noise Level (DNL) over sensitive noise receptors, would be a change significant enough to merit a new AICUZ study.

Airfield capacity is expressed in terms of the peak number of operations (takeoffs or landings) that the airfield is able to accommodate in a given period of time. Air Force Handbook 32-1084 *Facility Requirements* dated 1 September 1996 addresses the detailed methodology for calculating this constraint. It is a function of the mix of aircraft that use the airfield, the runway geometry, and similar factors.

For capacity and availability of training airspace, the relevant metrics are: the minimum required airspace volume, the utilization rates, and the distance to the airspace. In 2008, the Air Force undertook a comprehensive assessment of its natural and operational resources at Altus AFB (USAF 2008a). This effort, the 2008 NIA, sets forth measures and indices for assessing development potential for the installation, including the ability of the airfield and associated training airspace to absorb additional operations.

3.1.1.1 Environmental Noise

Noise is defined as a sound that, if loud enough, can induce hearing loss or is otherwise undesirable because it interferes with ordinary daily activities, such as communication or sleep. A human's reaction to noise varies according to the duration, type, and characteristics of the source, distance between the source and receiver, receiver's sensitivity, background noise level, and time of day.

The unit of measure used to quantify noise is the dB. It is a logarithmic ratio of the increase in atmospheric pressure that a sound event causes, compared to a defined reference pressure, which happens to be the lowest detectible pressure recognized by the human ear (0.00002 Pascals). When using dB to depict airborne sound pressure levels, 0 dB is the threshold of human hearing and exponential increases occur every 10 dB. An event that generates 60 dB of sound is 10 times louder than one that generates 50 dB. In addition to quantifying the pressure of a noise event, the quality of noise is described in terms of frequency or cycles per second (expressed as Hertz [Hz]). While the human ear can detect sound over a very wide spectrum of frequencies from 20 to 15,000 Hz, it is particularly well adapted to perceiving sounds at the middle range. An "A-weighted" dB is a dB corrected or weighted to reflect those frequencies heard especially well by humans.

The two basic ways of quantifying noise are to either describe it in terms of its peak intensity or in terms of a cumulative sum of energy averaged over a time duration. For assessing aircraft operations in the vicinity of an airfield, the DNL is the most widely accepted metric. As implied in its name, it is a cumulative exposure metric that sums the energy from individual noise events and spreads that over a 24-hour period, with an additional 10 dB added to those events occurring between 2200 hours and 0700 hours. The DNL is accepted by the Department of Defense (DoD), the Federal Aviation Administration (FAA), and several other agencies as the preferred metric for describing noise because it lends itself to comparing predicted noise exposure across various locations or in the same location across various time spans. For multiple event triggers, such as repetitive aircraft overflights along the same point on the ground, it provides a way to account for intensity, duration, and repetition of the events in order to compare cumulative exposure levels. Further, sociological studies indicate that there is a correlation between particular DNL values and community annoyance.

3.1.1.2 Noise from Aircraft Operations

The Air Force uses computer modeling to predict noise exposure in the vicinity of its airfields. The modeling software, NoiseMap 7.0, produces a grid of points and calculates the DNL for each point based on noise measurement data for flyovers and static engine run-ups. These data have been collected by the Armstrong Laboratory at Wright-Patterson AFB over the past 25 years. The operational flight profile characteristics specific to flying activities at Altus AFB

were collected and input into the model. Specifically, a data collection team visited Altus AFB in January and September 2008 to determine from pilots, maintenance personnel, and air traffic control personnel the flight tracks, flight profile (altitude, airspeed, and power settings), and operations counts to be modeled. Operations are broken down into phases of flight, specifically departures, arrivals, and closed pattern circuits.

3.1.2 Runway Complex/Airfield Capacity

The Air Force uses two primary measures, expressed in terms of operations per unit of time, to describe airfield capacity. As outlined in AFH 32-1084 *Facility Requirements*, the first metric is called Practical Hourly Capacity (PHOCAP) and the other is Practical Annual Capacity (PANCAP). These measures take into account the flight rules and meteorological conditions under which the aircraft are operating (Visual Flight Rules [VFR] or Instrument Flight Rules [IFR]), the runway geometry (parallel runways with sufficient lateral separation to permit simultaneous arrivals and departures), and other considerations.

The airfield at Altus AFB consists of two parallel runways, relatively closely spaced together (Figure 3-1). Between the two parallel runways lies a paved assault strip for use in training cargo aircraft in operating at austere airstrips. Runway 17R/35L is the innermost or inside runway (with respect to the aircraft parking ramps, hangars and the main base). Runway 17L/35R is the outermost runway (again, with respect to the aircraft parking ramps and hangars). The runways are each 150 feet wide and from centerline to centerline the distance separating them is 4,294 feet. The assault strip lies somewhat closer to the outside runway. The distance between the assault strip and Runways 17R/35L and 17L/35R is 2,492 and 1,802 feet, respectively.

For the purpose of calculating PHOCAP and PANCAP, the two runways have sufficient separation to permit simultaneous operations under VFR and IFR (staggered approaches). Air traffic control procedures and minimum aircraft separation standards permit simultaneous approaches under VFR for runways separated by more than 700 feet. The Unified Facility Criteria (UFC) 3-260-01 *Airfield and Heliport Planning and Design* calls for a minimum separation of 1,000 feet. The parallel runways meet these minimum separation standards.

Applying the standards of AFH 32-1084 to the parallel runway configuration found at Altus AFB, simultaneous approaches under IFR are also permitted. Both the inside runway (17R/35L) and the outside runway have ground-based navigation transmitters that would provide the course guidance to allow separate precision instrument approaches to each runway (i.e. a separate Instrument Landing System). Additionally, the Altus Radar Approach Control provides precision approach radar (PAR) to the inside runway and airport surveillance radar (ASR) approaches to all runways. This is a very labor-intensive effort; however, and in practice, simultaneous precision instrument arrivals do not occur to the parallel runways. Under IFR a minimum separation of 2,500 feet between parallel runway centerlines is required for simultaneous approaches. Therefore, under IFR Altus AFB does gain the increased throughput of having multiple runways. For operations under VFR, Altus AFB does see an increase in capacity as well because simultaneous operations to both runways can and do occur.

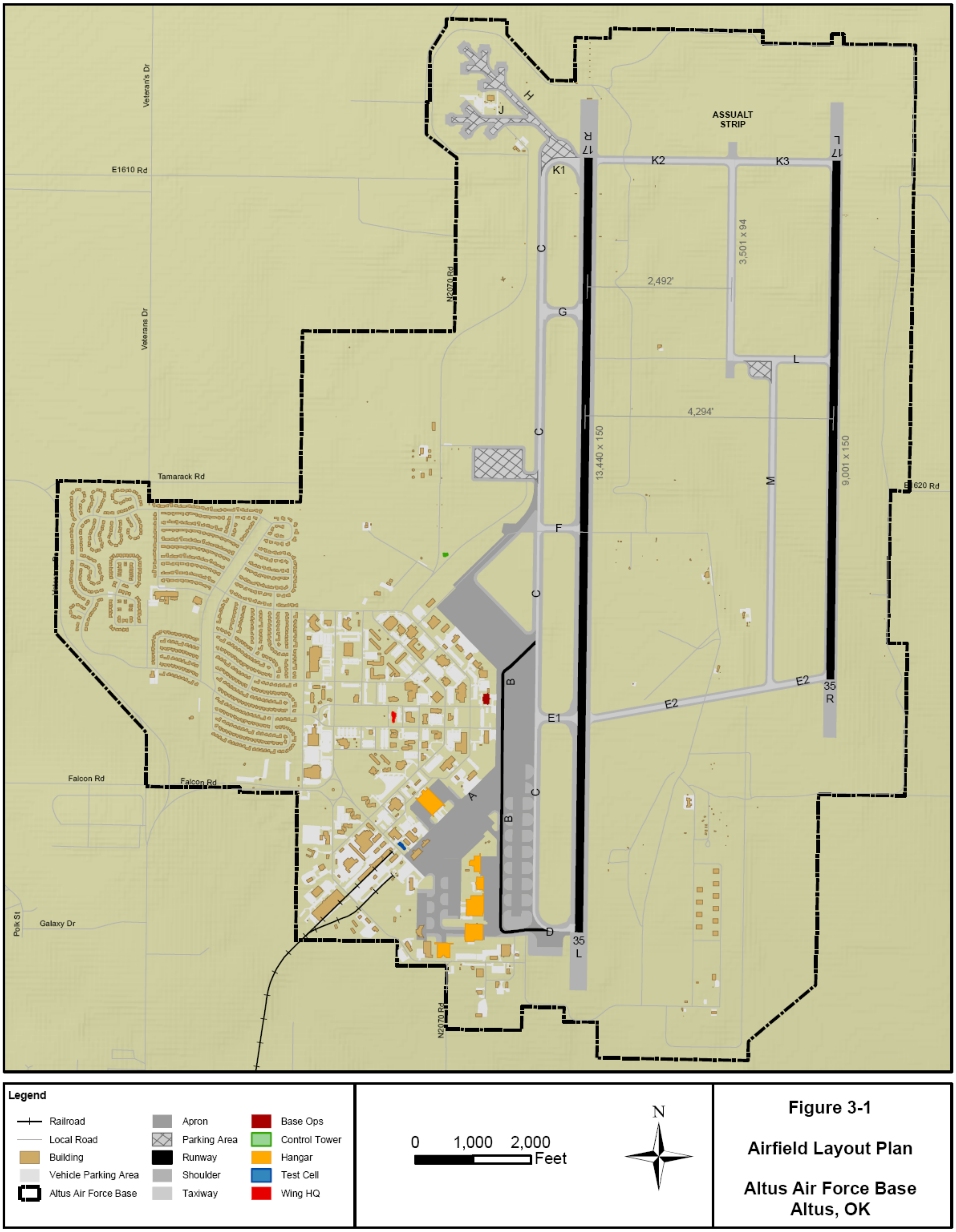


Figure 3-1

Airfield Layout Plan

Altus Air Force Base
Altus, OK

3.1.1 Current Aircraft Operations

Under baseline conditions, approximately 159,000 annual aviation operations occur at Altus AFB (Table 3-1). The mix of aircraft stationed at Altus AFB includes the C-17 *Globemaster*, a four-engine heavy cargo aircraft, and the KC-135 *Stratotanker*, a four-engine aerial refueler. The primary role of C-17 is for strategic, inter-theater airlift. The KC-135 provides aerial re-fueling during airlift operations, enhancing the mobility of the military. As an Air Education and Training Command installation, the mission of Altus AFB is to train pilots in these aircraft. Additionally, a wide variety of transient aircraft use Altus AFB over the course of a given year, including other heavy cargo jet aircraft, bombers, and fighters from other Air Force bases.

In recognition that the Air Force seldom flies at the same rates on weekends and holidays than it does during the workweek, the concept of an “average busy day” is employed so as to not understate the predicted noise exposure. That is, annual operations are divided by the number of flying days/weekdays in a year (usually 260) in order to arrive at the number of operations expected to occur on an average busy day at an airfield. Specifically, for the C-17 and KC-135, a divisor of 240 days per year was used. The divisor for transient aircraft was 260 days. The number of operations along the flight tracks and the profile data comprise the essential elements of the inputs to the noise model. Additionally, climatology, maintenance locations, runway utilization, and other factors are considered.

Table 3-1 Baseline[1] Average Busy-Day Aircraft Operations[2] at Altus AFB

	Altus Annual Operations			Altus Average Daily Operations		
	Arrivals[1] Departures	**Closed Patterns**	**Total**	**Arrivals[1] Departures**	**Closed Patterns**	**Total**
Based						
C-17	6,324	41,912	48,236	26.35	174.63	200.98
KC-135	7,200	100,800	108,000	30.00	420.00	450.00
Subtotal	13,524	142,712	156,236	56.35	594.63	650.98
Transient	220	3,120	3,340	0.85	12.00	12.85
Total	13,744	145,832	159,576	57.20	606.63	663.83

Source: USAF 2008b

(1) Note: Baseline indicates data collected in January and September 2008.

(2) Note: An operation is one departure (take-off) or one arrival (landing). A closed pattern consists of two operations (i.e., one departure and one arrival).

The output from the noise model is a set of predicted noise exposure values set on a grid. Once calculated, points having equal values are connected and depicted as noise contour lines. The contours are shown in five dB intervals beginning at 65 dB DNL and continuing to the 80+ dB interval. The areas with the highest values typically are closest to the runway, with diminishing values as the distance from the runway increases, normally along an axis corresponding to the flight tracks. Over 7,500 acres are exposed to elevated noise levels in the vicinity of Altus; however, much of the acreage consists of open space or the base itself (Table 3-2) The noise contours associated with baseline flight activities at Altus AFB run along a north-south axis (Figure 3-2).

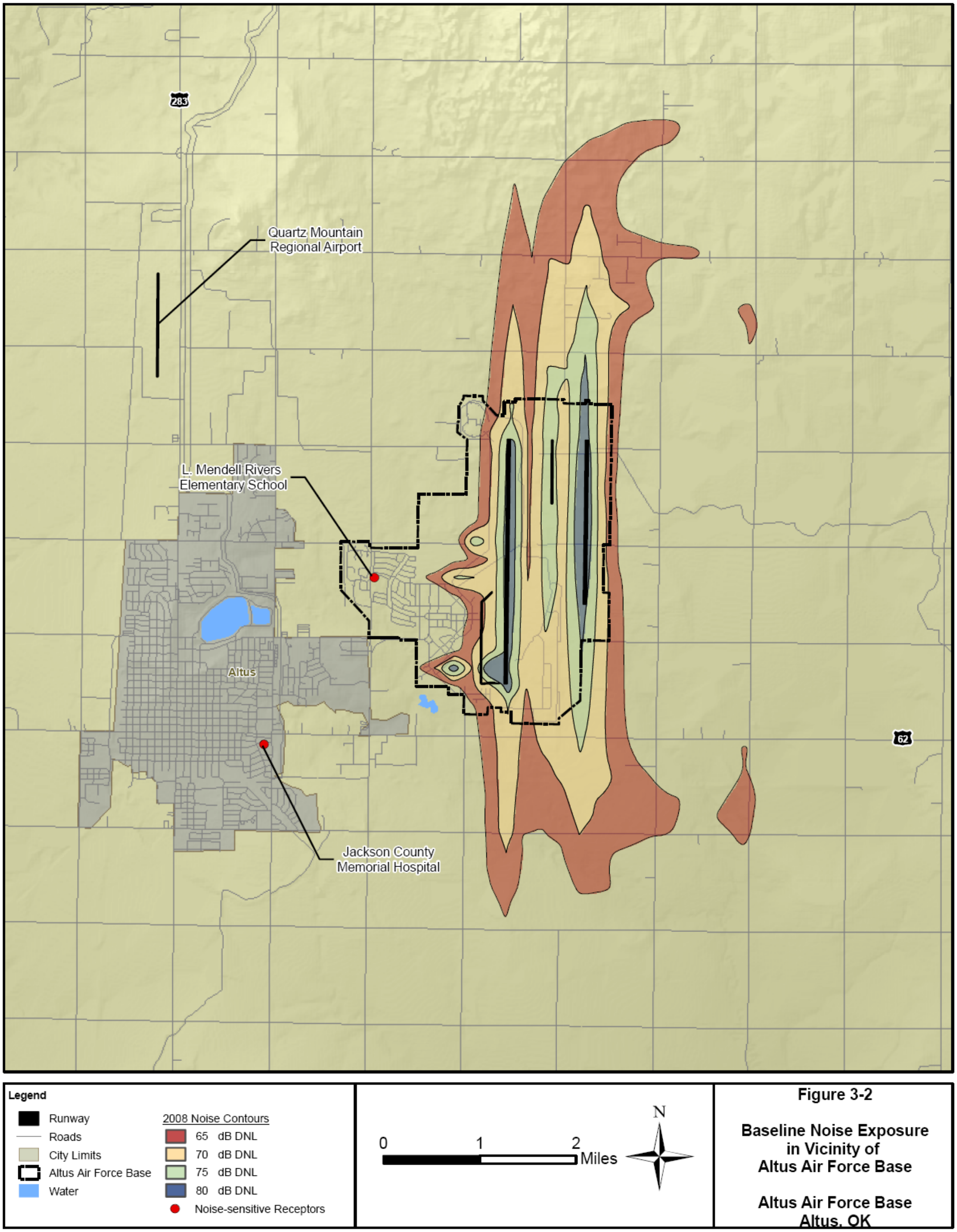


Figure 3-2

Baseline Noise Exposure
in Vicinity of
Altus Air Force Base

Altus Air Force Base
Altus, OK

Table 3-2 Land Area Exposed to Elevated Noise Levels

Noise Level DNL	Baseline: Land Area (Acres)
65 to 69	3,440.50
70 to 74	2,586.80
75 to 80	1,127.30
>80	412.88
Total	7,567.48

Source: USAF 2008b

Note: Data above derived using a contour topology set to "Adjacent Nested Rings", a contour's area represents the area of all locations where the grid metric is greater than the contour level but less than the next higher contour level.

DNL – Day-Night Average Noise Level

> – Greater than

In order to establish the maximum number of operations that could occur at Altus AFB from the perspective of predicted noise exposure, two noise-sensitive receptors were identified by installation personnel, and the predicted noise exposure at those points was calculated for the baseline scenario. Base personnel identified the Jackson County Memorial Hospital and the L. Mendell Rivers Elementary School as sensitive noise receptors (Table 3-3). The hospital and school lie approximately four miles southwest and two miles west of the nearest runway, respectively.

Table 3-3 Noise Exposure at Sensitive Receptors

Point Identification	Location/Sensitive Receptor	Baseline: Noise Level (dB DNL)
1	Jackson County Memorial Hospital, OK 34° 38’ 09.45” N; 99° 19’ 03.91653” W	50.2
2	L. Mendell Rivers Elementary School, OK 34° 39’ 40.84578” N; 99° 17’ 52.85072”W	55.6

Source: USAF 2008b and Belles 2008
OK – Oklahoma
N – north
W – West
dB DNL – Day Night Average decibels

After establishing the baseline predicted noise exposure at these locations, the number of operations that would be required to increase that exposure by two dB DNL was calculated.

Since the aircraft stationed at Altus AFB vary in the amount of noise they generate, several scenarios would be possible to arrive at the same increase. The scenario chosen was the one that would increase all based aircraft operations equally. This scenario was chosen to represent a realistic situation that could most likely occur.

3.2 AVIATION RESOURCES CAPACITY

3.2.1 Aircraft Operations

In order to assess the potential for increased operational intensity at Altus AFB, all based aircraft flight operations were hypothetically increased, and the increase in predicted noise exposure at the sensitive receptors was calculated. Once predicted noise exposure at one of the sensitive receptors was increased by two dB DNL, then the criteria identified by the Air Force in its instructions governing the AICUZ program for a significant change in noise exposure would be met. In the case of operations at Altus AFB, this would not occur until operations were increased by 57 percent for all aircraft operations. This would be an increase to 75,730 operations for C-17, and 166,547 operations for the KC-135 (Table 3-4). This represents a maximum flying activity scenario. A comparison between the 65 dB DNL noise contour associated with these increased activity levels and the baseline 65 dB DNL contour shows that the contour associated with the maximum flying activity level would extend further along the north-south axis than does the baseline contour previously described. The contours lengthen somewhat more than they widen, which is consistent with an increase in operations over a given point on the ground as opposed to an increase in intensity or loudness of the same number of aircraft in which case the contours widen (Figure 3-3). Of potentially greater significance would be the wrapping around to the east of the 65 dB DNL contour. This contour in this area is associated with aircraft performing repetitive closed pattern operations overhead, flying along a fairly narrow corridor with little dispersion. This is common at training bases since the closed pattern and “touch and go” operations allow for the ability to practice many of these events in a fairly compressed period of time. The change in land area exposed to increased noise exposure compared to the baseline conditions would be over 3,404.32 acres (Table 3-5).

Table 3-4 Maximum Development Alternative (2 dB increase from Baseline)[1]

	Altus Annual Operations			Altus Average Daily Operations		
	Arrivals[2] Departures	**Closed Patterns**	**Total**	**Arrivals[2] Departures**	**Closed Patterns**	**Total**
Based						
C-17	9,929	65,798	75,727	41.37	274.16	315.53
KC-135	8,290	158,256	166,546	34.54	659.40	693.94
Subtotal	18,219	224,054	242,273	75.91	933.56	1,009.47
Transient						
	346	4,898	5,244	1.33	18.84	20.17
Total	18,565	228,952	247,517	77.24	952.40	1029.64

Source: USAF 2008b and GMI 2008

[1]Note: The scaling is to the Baseline data. Sample points chosen were Jackson County Memorial (34° 38’ 09.45” N; 99° 19’ 03.91653”W) and L. Mendell Rivers Elementary School (34° 39’ 40.84578” N; 99° 17’ 52.85072”W). In order to increase the DNL by 2 dB, all based and transient aircraft operations (i.e., C-17, and KC-135) can increase by 57%. The annual numbers have been rounded to the nearest whole number and annual totals may not add due to rounding.

[2] Note: An operation is one departure (take-off) or one arrival (landing). A closed pattern consists of two operations (i.e., one departure and one arrival).

dB – decibel
DNL – Day-Night Average Noise Level

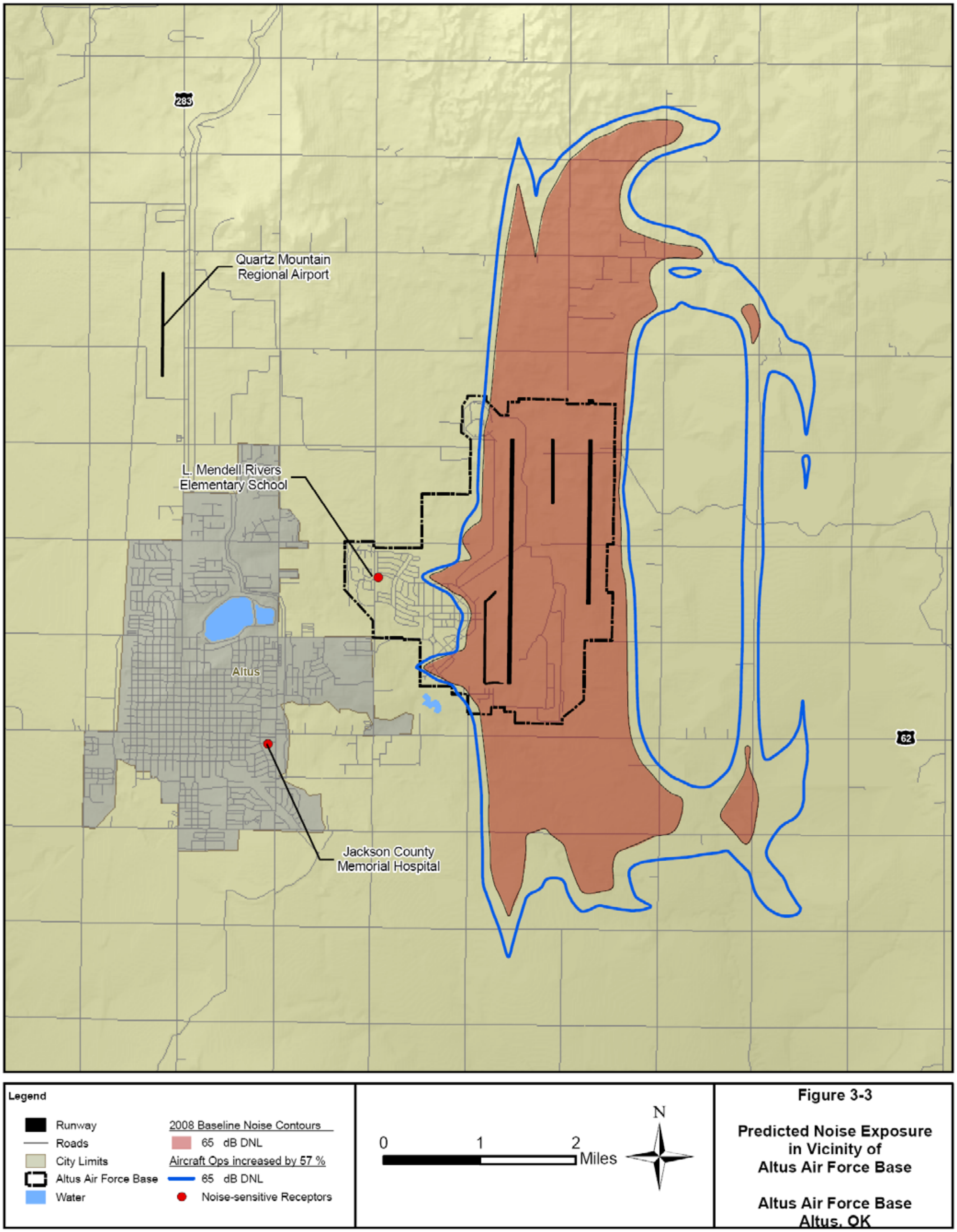


Figure 3-3

Predicted Noise Exposure in Vicinity of Altus Air Force Base

Altus Air Force Base
Altus, OK

Table 3-5 Comparison of Land Area Exposed to Elevated Noise Levels (Baseline versus Maximum Development Alternative)

Noise Level (DNL)	Baseline: Land Area (Acres)	Maximum Development Alternative: Land Area (Acres)
65 to 69	3,440.50	5,706.1
70 to 74	2,586.80	2,807.2
75 to 80	1,127.30	1,760.8
>80	412.88	697.7
Total	7,567.48	10,971.8

Source: USAF 2008b and GMI 2008

Note: Data above derived using a contour topology set to "Adjacent Nested Rings", a contour's area represents the area of all locations where the grid metric is greater than the contour level but less than the next higher contour level.

DNL – Day-Night Average Noise Level

>– Greater than

3.2.2 Airfield Capacity

As noted previously, many factors influence the airfield capacity, including air traffic control considerations, runway geometry, prevailing meteorological conditions including winds and precipitation, and the mix of aircraft model types that make use of an airfield. For this document, the runway capacity is assessed using AFH 32-1084 *Facility Requirements,* which draws heavily from civilian airport capacity analysis standards developed by the FAA and published in Advisory Circular 150/5060-5 *Airport Capacity and Delay*. Capacity assumptions, whether expressed in terms of annual operations or hourly VFR or IFR operations, are based on runway utilizations that produce the highest sustainable capacity consistent with current air traffic control practices and current regulations governing flight operations.

The first measure is (PANCAP, which is an annual theoretical throughput for an airfield runway complex). For a runway configuration such as that found at Altus AFB, a dual-parallel runway configuration is used for calculating IFR operations. Applying the relevant standard from AFH 32-1084 (Table 2-3, page 26 “Configuration Layout C – Independent IFR approach-departure parallels” with an aircraft mix of “3”), the PANCAP would be 390,000 operations per year. It is important to note the limitations of this metric. PANCAP was developed to assist the FAA and airport operators serving air carrier operations (i.e., airports with scheduled airline service) in their facility planning process. While useful to DoD facility planners, the inherent operational differences between a flight training base or a base conducting evaluation of weapons or tactics, and a large-scale commercial airport such as Dallas Fort Worth, should be kept in mind. Compared to operations conducted at air carrier airports, flying activities in a training base environment rely upon operations occurring under VFR (particularly for recoveries and closed pattern circuits) much more than they operate under IFR. Therefore, it is possible that Altus AFB is able to accommodate more flight operations per year than what PANCAP indicates is a theoretical maximum.

A second somewhat more relevant measure of describing runway throughput capacity at Altus AFB is the PHOCAP. This metric is broken down into IFR and VFR hourly numbers. Again, applying the relevant sketch from AFH 32-1084 (Table 2-3, page 26 "Configuration Layout C – Independent IFR approach-departure parallels" with an aircraft mix of "3") yields a PHOCAP of 108 VFR and 79 IFR operations per hour. Assuming a 15-hour flying day (0700 hours to 2200 hours) and 240 flying days per year, yields a theoretical VFR capacity of 388,800 operations. The IFR capacity would be 284,400 operations. If additional capacity were necessary, the base could expand its flying window, either by flying on weekends, increasing the length of the training day, or both.

There is sufficient runway throughput capacity for the airfield at Altus AFB to accommodate a 57 percent increase in operations of all based aircraft. Current operations of all aircraft at Altus AFB were 159,336 in Fiscal Year 2008. Increasing all based aircraft operations would only increase the overall operations counts to 247,520 which is still under the overall theoretical capacity of the airfield.

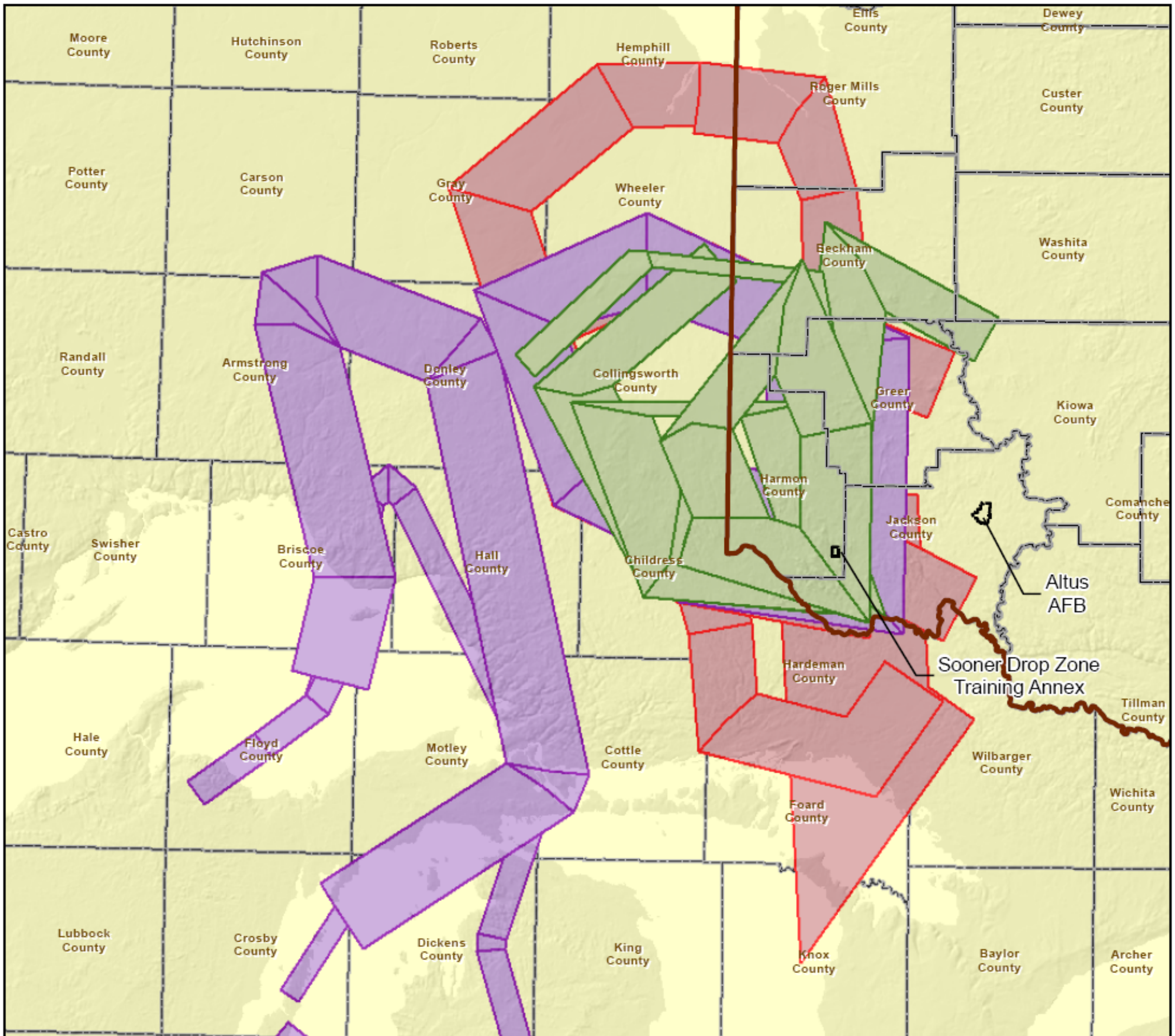
3.2.3 Airspace Utilization and Management

The previously referenced 2008 NIA prepared for Altus AFB did not identify training airspace as a constraint on current or future operations. The military training routes under Altus AFB's management encompass over 13,517 square miles. Altitudes vary with the route but they generally are usable from 8,000 feet above mean sea level (msl) down to as low as 300 feet above ground level (agl) (Figure 3-4). They also are in relatively close proximity, with minimal flight times required to access them.

To assess airspace capacity, it is useful to describe typical daily levels of activity at Altus AFB. The mission of the base is to train pilots in model specific Cargo/Tanker Transition Training subsequent to their receiving introduction to airlift training elsewhere. The minimum airspace areas and volumes (size) of required training airspace primarily depends upon the flight and operational characteristics of the aircraft that use it along with other factors. The minimum size and volume vary by aircraft types and phase of the training syllabus because the airspeeds and climb performance of the three types of training aircraft vary as do the required maneuvers throughout the course of instruction.

The AFI 13-201, *Airspace Management*, does not depict recommended sizes for the C-17 or KC-135 airframe. Therefore the NIA relied upon interviews with installation airfield and airspace management personnel. Interviews and data collected with the NIA process earlier in 2008 indicate that the military training route used by aircraft stationed at Altus AFB are relatively free from encroachment and available as needed for the current mission.

If a beddown of additional aircraft were proposed for Altus AFB, a Test and Training Space Needs Statement (TTSNS) specific to that proposal would be developed to ascertain whether designation of additional special use airspace would be warranted. Present indications are that current operations are unconstrained by training airspace limitations.



NAME	Area (Sq.NM)	Height (NM)	Volume (Cubic NM)
IR154	880	Varies	550
IR155	2061	Varies	1471
IR193	1949	Varies	960
		Total	2981
SR205	795	1.37	1089
SR206	767	1.37	1051
SR208	806	Varies	1073
SR216	390	1.37	534
SR217	849	1.37	1164
		Total	4911
VR144	1311	0.38	498
VR190	1522	Varies	703
VR198	2187	Varies	926
		Total	2127

Legend
County Boundary
State Boundary
Altus Air Force Base
Slow Routes
INstrument Routes
Visual Routes

0 5 10 20 Miles

N

Figure 3-4

Altus Air Force Base Training Airspace

Altus Air Force Base
Altus, OK

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CHAPTER 4
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Appendix C

Air Emissions Calculations

Appendix C - Air Emission Calculations

Contents:

Tables

Attachments:
EDMS Model Input and Output Printouts.

Emission Calculations:

Contruction/Demolition Equipment Emissions:

Construction EF (lb/1,000 ft^2)= Average Construction Equipment Usage Rate (hr/ 1,000 ft^2) x Equipment EF (lb/hr)

Where,
EF = emission factor

Pollutant Emissions (lbs) = Construction EF (lb/1,000 ft^2) x total square feet of construction or demolition

Fugitive Dust Emissions:

Annual PM10 emissions = 0.11 ton PM10/acre/month x (total acres constructon+paving, or demoliton, or renovation) x total months of activity

Source: Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from construction.

Paving Equipment Equipment Emissions:

Paving EF (lb/1,000 yd^3)= Average Paving Equipment Usage Rate (hr/ 1,000 yd^3) x Equipment EF (lb/hr)

Where,
EF = emission factor

Pollutant Emissions (lbs) = Paving EF (lb/1,000 yd^3) x total ft^3 of asphalt/27 ft^3/yard/1,000

Evaporative VOC Emissions from Asphalt Paving:

Annual VOC emissions = Area paved (ft^2) x depth of paving (ft) x 68.56 lb/ft^3 x weight percent of asphalt which evaporates (%)

Where,
depth of paving = 4 inches
68.56 lb/ft^3 = density of asphalt
weight percent = 5%
VOC = volatile organic compounds
Note: Above calculation for cutback asphalt. Hot mix asphalt is the predominate type of asphalt used today. Hot mix asphalt emissions are at least an order of magnitude less. Above emissions divided by 10 to reduce by one order of magnitude.

Grading Equipment Emissions (Regrading of Clear Zones of 17L/35R)

Pollutant Emissions (lbs) = [Days worked (days/yr) x hours/day (hr/day)) x horsepower (hp) x load factor(%) x emission factor (g/hp-hr)]/454 g/lb

Where,
load factor = percentage of full horsepower equipment typically operated
454 g/lb = conversion factor from grams to pounds

Grading Fugitive Dust Emissions (Regrading of Clear Zones of 17L/35R)

Annual PM10 emissions = 0.011 ton PM10/acre/month + 0.059 ton/1,000 yd^3 earth moved

Source: Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from construction.

Privately Owned Vehicle (POV) Emissions

Pollutant emissions = Total vehicle miles traveled per year (miles/yr) x Pollutant EF (lb/mile)

Emission Factor Source: South Coast Air Quality Management District (SCAQMD), Highest (Most Conservative) EMFAC2007 (version 2.3). Emission Factors for On-Road Passenger Vehicles (<8,500 lbs).

Table C-1
Proposed Action - Summary of Emissions
Altus Air Force Base
Jackson County, Oklahoma

Year	Total Air Emissions (tpy)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$ [a]
2010	19.9	20.1	42.1	4.5	44.5	44.5
2011	7.8	2.0	14.6	1.5	10.0	10.0
2012	13.0	19.8	22.8	2.2	135	135
2014	9.3	5.3	18.8	2.0	12.9	12.9
2015	34.3	6.0	78.0	8.5	50.7	50.7

CO = carbon monoxide

NO_x = nitrogen oxides

$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter

PM_{10} = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

Notes:

a Assumed $PM_{2.5}$ = PM_{10}.

Table C-2
Proposed Action - Activities by Year
Altus Air Force Base
Jackson County, Oklahoma

Project Title	Description	Programmed Year	Building Number	Renovation (ft^2)	New Construction (ft^2)	Additional Infrastructure (ft^2)	Demolition (ft^2)	of Pavement and Roadways (ft^2)	Total Concrete or Asphalt Paved Area (ft^2)
Repair Taxiways	Remove and dispose of existing asphalt and stressed pavements on the taxiway and apron areas and shoulders. Place new asphalt and concrete pavements in the taxiway and apron areas. Replace taxiway edge lighting and conduit.	2010	-	--	--	877,374	--	500,000	877,374
Construct DASR/RAPCON Facility	The new building would sited near the existing Control Tower, building 525 and would house DASR, RAPCON and Air Traffic Control training functions. Facility construction is composed of a concrete foundation, structural steel framing, masonry/concrete veneer, standing seam metal roof and a parking area. Demolition will include the removal of building 415 totaling 561 square meters (SM). In addition, two existing golf course holes must be relocated in accordance with the Altus AFB 2030 Plan. The facility includes minimum DoD Force Protection standards.	2011	near 525	--	31,506	13,455	6,039		44,961
Construct Consolidated Component Repair Facility	Construct 43,000 square foot (SF) Consolidated Component Repair Facility (Precision Measuring Equipment Lab [PMEL]): Construct 43,000 SF facility to house all shops that fall under the purview of the Component Repair Division of the Maintenance Directorate. Facility will consolidate shops currently housed in 4 sub-standard facilities. Shops include PMEL, Avionics, Battery, Oxygen, Survival Equipment, & Hydraulics shops. Isolate HVAC to PMEL & Survival Equipment shop from HVAC of other shops. Demolition will include the removal of buildings, 323, 330 and 15,000 SF of building 444 for a total of 52,170 SF. PMEL must meet requirements of Air Force Manual 32-1094, Chapter 10, which includes the ability to tightly control humidity and temperature and maintain positive air pressure in the lab via airlocks.	2011	new	--	43,000	--	52,170	--	43,000
Construct Fire Station	Reinforced concrete foundation and floors, masonry walls and roof system. Includes a minimum of six drive-through vehicle bays, alarm communication center, training facilities, living quarters with sleeping quarters for a minimum of eighteen personnel, recreation/dining, administration, maintenance, repair, storage, and support areas. Demolition will include the removal of building 267.	2011	new	--	30,193	--	16,332	--	30,193
Regrade Clear Zones of 17L/35R	Correct Grade Changes in Clear Zone: Correct transverse grade problems and violations within the lateral clearance zone and runway clear zones at runway 17L/35R north and south.	2012	--	34,848,000	--	--	--	--	
Construct Main & South Entry Control Facilities	Reconfigure Main & South Gates to meet ATFP standards. Reroute roads, construct covered inspection areas, install pop up barriers, relocate guard shacks, & provide overwatch areas. Demolish 100 SM of Guard Houses and 5,000 SM of existing roadways and improvements.	2012	426 & 2000	--	7,535	304,621	1,076	53,820	304,621
Expand KC-135 Parking Apron	Excavate, prepare sub-base and base and install 21-inch portland cement concrete apron and taxiway. Install asphalt, apron lights, pavement markings, and drainage.	2012	--	--	32,000	--	--	--	32,000
Expand Fitness Center	Expand Fitness Center: Construct second floor to building 156 for exercise room, cardiovascular equipment room and the HAWC. Renovate area for free and resistance weight training rooms. Upgrade mechanical and electrical systems for the facility.	2014	156	17,470	--	--	--	--	
Replace R/W 173/353 Assault Strip	Replace surface of assault strip runway. The entire 4,350 foot runway will be changed from existing asphaltic cement concrete surface to a 75-foot wide, 18-inch thick granitic aggregate concrete keel, and asphalt shoulders.	2014	--	326,250	--	--	--	--	326,250
Construct Collocated Club with Visiting Quarters	Construct a collocated club with visiting quarters. Club will include lodging front desk to replace building 82, officer's club, NCO club, conference room, DV suites and about 40 additional rooms. Demolition will inclucde removal of building 307 and 6,000 sq ft of bulilding 82.	2015	new	--	35,000	--	30,000	--	35,000
Construct Joint Security Forces/OSI Facility	Construct a new joint use facility to house the 97th Security Forces Squadron operations and supply/mobility functions, the OSI Detachment 422, and the Wing ATFP Office. Demolition will include the removal of building 130.	2015	new	--	22,500	--	14,000	--	22,500
Replace Runway 17L/35R, Parallel Runway	Replace asphaltic cement concrete surface of parallel runway 17L/35R with granitic concrete keel and all shoulders.	2015	--	1,350,000	--	--	--	--	1,350,000
PME/Education Center	Consolidate FTAC, ALS, Honor Guard and Education Center into one facility.	2015	new	--	34,000	--	--	--	
			Totals	36,541,720	235,734	1,195,450	119,617	553,820	3,065,899

ft^2 = square feet

Table C-3
Proposed Action - Emissions from Construction, Renovation and Demolition
Altus Air Force Base
Jackson County, Oklahoma

Year 2010		Heavy Equipment Total Emissions (tpy)					Fugative Dust[a] (tpy)	Total Air Emissions (tpy)					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[b]**
Demolition	500,000	4.6	0.91	11.4	1.19	0.79	41.7	4.6	0.91	11.4	1.2	42.5	42.5
							TOTAL	**4.6**	**0.91**	**11.4**	**1.2**	**42.5**	**42.5**
Year 2011		**Heavy Equipment Total Emissions (tpy)**					**Fugative Dust[a] (tpy)**	**Total Air Emissions (tpy)**					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[b]**
New Construction	104,699	4.5	0.75	10.3	1.1	0.7	6.8	4.5	0.75	10.3	1.1	7.4	7.4
Demolition	74,541	0.69	0.14	1.7	0.18	0.12	2.3	0.7	0.14	1.7	0.18	2.4	2.4
							TOTAL	**5.2**	**0.89**	**12.0**	**1.3**	**9.8**	**9.8**
Year 2012		**Heavy Equipment Total Emissions (tpy)**					**Fugative Dust[a] (tpy)**	**Total Air Emissions (tpy)**					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[b]**
New Construction	7,535	0.33	0.054	0.74	0.079	0.049	10.4	0.33	0.054	0.74	0.079	10.5	10.5
Demolition	54,896	0.51	0.10	1.3	0.13	0.086	1.7	0.51	0.10	1.3	0.13	1.7	1.7
							TOTAL	**0.84**	**0.15**	**2.0**	**0.21**	**12.2**	**12.2**
Year 2014		**Heavy Equipment Total Emissions (tpy)**					**Fugative Dust[a] (tpy)**	**Total Air Emissions (tpy)**					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[b]**
Renovation	17,470	0.75	0.13	1.7	0.18	0.11	11.7	0.75	0.13	1.7	0.18	11.8	11.8
							TOTAL	**0.75**	**0.13**	**1.7**	**0.18**	**11.8**	**11.8**
Year 2015		**Heavy Equipment Total Emissions (tpy)**					**Fugative Dust[a] (tpy)**	**Total Air Emissions (tpy)**					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[b]**
New Construction	57,500	2.5	0.41	5.6	0.60	0.37	44.4	2.5	0.41	5.6	0.60	44.8	44.8
Demolition	44,000	0.41	0.080	1.0	0.10	0.069	1.3	0.41	0.080	1.0	0.10	1.4	1.4
							TOTAL	**2.9**	**0.49**	**6.7**	**0.71**	**46.2**	**46.2**

CO = carbon monoxide
ft^2 = square feet
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound
Notes:
a Emission calculation from the Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from Construction.
Annual PM_{10} emissions = 0.11 ton PM_{10}/acre/month * (total acres new constructon+paving, or renovation, or demolition)*12 months
b Assumed $PM_{2.5}$ = PM_{10}.

Table C-4
Proposed Action - Emissions from Paving Operations
Altus Air Force Base
Jackson County, Oklahoma

Year	Area (ft^2)	Depth (in)	Total Air Emissions[k] (tpy)					
			CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$[l]
2010[a]	292,458	4	0.77	16.8	0.21	0.021	0.015	0.015
2010[b]	584,916	18	12.9	2.3	30.3	3.3	1.9	1.9
2011[c]	13,455	4	0.036	0.77	0.010	9.56E-04	7.12E-04	7.12E-04
2011[d]	104,699	8	1.0	0.18	2.4	0.26	0.15	0.15
2012[e]	304,621	4	0.80	17.4	0.22	0.022	0.016	0.016
2012[f]	32,000	21	0.82	0.15	1.9	0.21	0.12	0.12
2014[g]	43,500	6	0.17	3.7	0.047	4.64E-03	3.45E-03	3.45E-03
2014[h]	326,250	18	7.2	1.3	16.9	1.8	1.1	1.1
2015[i]	57,500	8	0.56	0.10	1.3	0.14	0.084	0.084
2015[j]	1,350,000	18	29.7	5.3	69.9	7.6	4.4	4.4

CO = carbon monoxide
ft^2 = square feet
in = inches
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound

Notes:

a Asphalt Paving; it was assumed that hot mix asphalt will be used for all asphalt paved areas. Assumed 4" thickness. It was assumed that 1/3 of the total paving area will be asphalt .
b Concrete paving: assumed 18 inch thickness for apron and taxiways. Assumed 2/3 of total paving area will be concrete.
c It was assumed that the parking area would be hot mix asphalt. Assumed 4" thickness.
d It was assumed that all new construction would be built upon concrete slab. Assumed 8" thickness.
e It was assumed that all paved areas would be hot mix asphalt. Assumed 4" thickness.
f Assumed that the entire 32,000 ft^2 of paved area was 21" concrete.
g Assumed shoulder width of 5 ft. on either side of concrete runway. Assumed 6" thickness.
h 4,350 ft. by 75 ft. concrete runway, 18" thick.
i It was assumed that all new construction would be built upon concrete slab. Assumed 8" thickness.
j Concrete runway replacement, assumed 18" thick.
k Equipment emisions and evaporative VOC emissions. Fugitive dust emissions from ground preparation are shown in Table D-3, included new construction fugitive dust emissions.
l Assumed $PM_{2.5}$ = PM_{10}.

Table C-5

Proposed Action - Emissions from Grading Operations in 2012[a]
Altus Air Force Base
Jackson County, Oklahoma

Equipment Operation (Exhaust Emissions)

Type	Days worked per year	Hours Operation (hr/day)	Hours Operation (hr/yr)	Horsepower (hp)	Load Factor[b] (%)	Emission Factors[c] PM$_{10}$ (g/hp-hr)	PM$_{2.5}$[d] (g/hp-hr)	NOx (g/hp-hr)	CO (g/hp-hr)	SOx (g/hp-hr)	VOC (g/hp-hr)
Light Truck	160	8	1,280	250	25	0.80	0.80	9.6	2.8	0.89	0.84
Dump Truck	160	8	1,280	658	25	0.80	0.80	9.6	2.8	0.89	0.84
Water Truck	160	8	1,280	658	25	0.80	0.80	9.6	2.8	0.89	0.84
Scraper	160	8	1,280	1200	60	1.26	1.26	8.7	5.0	0.90	0.71
Front-end Loader	160	8	1,280	300	38	1.05	1.05	10.1	6.8	0.85	1.43
Grader	160	8	1,280	300	54	1.0	1.0	9.6	3.8	0.87	1.57
Bobcat	160	8	1,280	85	48	1.44	1.44	9.6	9.0	0.93	2.14

Equipment Operation (Exhaust Emissions Continued)

Type	Emission Rates PM$_{10}$ (ton/yr)	PM$_{2.5}$ (ton/yr)	NOx (ton/yr)	CO (ton/yr)	SOx (ton/yr)	VOC (ton/yr)	Fugitive Dust Emissions[d] Total Area (acre)	Total Earth Moved[e] (1,000 yd^3)	General Factor (ton/acre/ month)	On-site Cut/Fill[f] (ton/1,000 yd^3)	PM$_{10}$[g] (ton/yr)
Light Truck	0.070	0.070	0.85	0.25	0.078	0.074	800	840	0.011	0.059	120
Dump Truck	0.19	0.19	2.2	0.65	0.21	0.19					
Water Truck	0.19	0.19	2.2	0.65	0.21	0.19					
Scraper	1.3	1.3	8.8	5.1	0.913	0.7					
Front-end Loader	0.17	0.17	1.6	1.1	0.14	0.23					
Grader	0.23	0.23	2.2	0.87	0.20	0.36					
Bobcat	0.083	0.083	0.55	0.52	0.053	0.12					
Totals	**2.2**	**2.2**	**18.5**	**9.1**	**1.8**	**1.9**					

CO = carbon monoxide
ft^2 = square feet
g/hp-hr = gram per horsepower - hour
hp = horsepower
hr'day = hours per day
hr/yr = hours per year
NO$_x$ = nitrogen oxides
PM$_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM$_{10}$ = particulate matter equal or less than 10 micrometers in diameter
SO$_x$ = sulfur oxides
ton/yr = tons per year
VOC = volatile organic compound
yd^3 = cubic yard

Notes:

a Emissions are from the regrading of the clear zones of 17L/35R in year 2012. It was assumed that it would take 32 weeks (160 days/year working 8 hours/day to complete).
b Nonroad Engine and Vehicle Emission Study (11/91), Table 2-05
c Nonroad Engine and Vehicle Emission Study (11/91), Table 2-07
d Calculations based upon emission factors from Western Regional Air Partnership (WRAP), "WRAP Fugitive Dust Handbook," 2004, Table 3-2
Conservatively assumed that the entire area of clear zones of 17L/35R (34,848,000 ft^2) will require regrading.
e Based upon the assumptions that one scraper can move 70,000 yd^3 and one truck can move 35,000 yd^3 of material in one month (duration: 32 weeks = 8 months).
f Assumed that all cut/fill is on-site.
g Assumed PM$_{2.5}$ = PM$_{10}$.

Table C-6
Proposed Action - Emissions from Construction POV[a]
Altus Air Force Base
Jackson County, Oklahoma

Car/Light Truck (Exhaust Emissions)

Year	Days worked per year	Total Number of Worker Vehicles	Vehicles Miles Traveled (miles/day)	Vehicles Miles Traveled (miles/yr)	Emission Factors[b]					
					PM_{10} (lb/mile)	$PM_{2.5}$[c] (lb/mile)	NOx (lb/mile)	CO (lb/mile)	SOx (lb/mile)	VOC (lb/mile)
2010	250	15	100	375,000	8.70E-05	8.70E-05	9.18E-04	8.26E-03	1.08E-05	9.14E-04
2011	250	15	100	375,000	8.88E-05	8.88E-05	8.45E-04	8.26E-03	1.08E-05	8.52E-04
2012	250	15	100	375,000	8.98E-05	8.98E-05	7.76E-04	7.65E-03	1.07E-05	7.96E-04
2014	250	15	100	375,000	9.18E-05	9.18E-05	6.55E-04	6.60E-03	1.07E-05	7.02E-04
2015	250	15	100	375,000	9.26E-05	9.26E-05	6.02E-04	6.14E-03	1.07E-05	6.64E-04

Car/Light Truck (Exhaust Emissions Continued)

Year	Emission Rates					
	PM_{10} (ton/yr)	$PM_{2.5}$[c] (ton/yr)	NOx (ton/yr)	CO (ton/yr)	SOx (ton/yr)	VOC (ton/yr)
2010	0.016	0.016	0.17	1.5	2.02E-03	0.17
2011	0.017	0.017	0.16	1.5	2.02E-03	0.16
2012	0.017	0.017	0.15	1.4	2.01E-03	0.15
2014	0.017	0.017	0.12	1.2	2.00E-03	0.13
2015	0.017	0.017	0.11	1.2	2.01E-03	0.12

CO = carbon monoxide
ft^2 = square feet
g/hp-hr = gram per horsepower - hour
hp = horsepower
hr'day = hours per day
hr/yr = hours per year
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
POV = privately owned vehicle
SO_x = sulfur oxides
ton/yr = tons per year
VOC = volatile organic compound
Notes:
a Construction worker private vehicle travel to the work sites on-base. Conservatively assumed every worker vehicle would travel 100 miles per day for 250 days worked each year.
b Highest (Most Conservative) EMFAC2007 (version 2.3). Emission Factors for On-Road Passenger Vehicles (<8,500 lbs). Derived from Peak Emissions Inventory(summer, annual , winter). Source: South Coast Air Quality Management District (SCAQMD).
c Assumed $PM_{2.5} = PM_{10}$.

Table C-7

Potential Development Alternative[a]

Summary of Emissions

Altus Air Force Base

Jackson County, Oklahoma

Year	Total Air Emissions (tpy)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$[b]
2010	26.6	51.5	53.7	5.8	64.2	64.2
2011	14.6	33.4	26.2	2.8	29.7	29.7
2012	19.8	51.2	34.4	3.5	154	154
2014	16.0	36.7	30.4	3.3	32.6	32.6
2015	41.0	37.4	89.6	9.7	70.4	70.4

CO = carbon monoxide

NO_x =nitrogen oxides

$PM_{2.5}$ =particulate matter equal or less than 2.5 micrometers in diameter

PM_{10} = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

Notes:

a Includes total emissions from Proposed Action, Table A-1.

b Assumed $PM_{2.5}$ = PM_{10}.

Table C-8

PDA - Emissions from Construction[a]

Altus Air Force Base

Jackson County, Oklahoma

Year 2010		Heavy Equipment Total Emissions (tpy)					Fugative Dust[b] (tpy)	Total Air Emissions (tpy)					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[c]**
New Construction	91,961	4.0	0.66	9.0	0.96	0.59	18.9	4.0	0.66	9.0	0.96	19.5	19.5
							TOTAL	**4.0**	**0.66**	**9.0**	**0.96**	**19.5**	**19.5**

Year 2011		Heavy Equipment Total Emissions (tpy)					Fugative Dust[b] (tpy)	Total Air Emissions (tpy)					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[c]**
New Construction	91,961	4.0	0.66	9.0	1.0	0.59	18.9	4.0	0.66	9.0	1.0	19.5	19.5
							TOTAL	**4.0**	**0.66**	**9.0**	**1.0**	**19.5**	**19.5**

Year 2012		Heavy Equipment Total Emissions (tpy)					Fugative Dust[b] (tpy)	Total Air Emissions (tpy)					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[c]**
New Construction	91,961	4.0	0.66	9.0	1.0	0.59	18.9	4.0	0.66	9.0	1.0	19.5	19.5
							TOTAL	**4.0**	**0.66**	**9.0**	**0.96**	**19.5**	**19.5**

Year 2014		Heavy Equipment Total Emissions (tpy)					Fugative Dust[b] (tpy)	Total Air Emissions (tpy)					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[c]**
New Construction[d]	91,961	4.0	0.66	9.0	1.0	0.59	18.9	4.0	0.66	9.0	1.0	19.5	19.5
							TOTAL	**4.0**	**0.66**	**9.0**	**1.0**	**19.5**	**19.5**

Year 2015		Heavy Equipment Total Emissions (tpy)					Fugative Dust[b] (tpy)	Total Air Emissions (tpy)					
Activity	**ft^2**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**PM_{10}**	**CO**	**VOC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$[c]**
New Construction	91,961	4.0	0.66	9.0	1.0	0.59	18.9	4.0	0.66	9.0	1.0	19.5	19.5
							TOTAL	**4.0**	**0.66**	**9.0**	**1.0**	**19.5**	**19.5**

CO = carbon monoxide

ft^2 = square feet

NO_x = nitrogen oxides

PDA = potential development alternative

$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter

PM_{10} = particulate matter equal or less than 10 micrometers in diameter

SO_x = sulfur oxides

tpy = tons per year

VOC = volatile organic compound

a Total square feet of additional PDA construction shown Table 2-4 (459,804 ft^2) is equally divided among the 5 years of the Alternative 2 Action (2010-2012, 2014 and 2015).

b Emission calculation from the Western Regional Air Partnership (WRAP) Fugitive Handbook (11/04) Section 3.2 PM Emissions from Construction.
Annual PM_{10} emissions = 0.11 ton PM_{10}/acre/month * (total acres constructon+paving or demolition)*12 months

c Assumed $PM_{2.5} = PM_{10}$.

Table C-9
PDA - Emissions from Paving Operations
Altus Air Force Base
Jackson County, Oklahoma

Year	Area (ft^2)	Depth (in)	Total Air Emissions[k] (tpy)					
			CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$[c]
2010[a]	533,174	4	1.4	30.5	0.39	0.038	0.028	0.028
2010[b]	91,961	8	0.90	0.16	2.1	0.23	0.13	0.13
2011[a]	533,174	4	1.4	30.5	0.39	0.038	0.028	0.028
2011[b]	91,961	8	0.90	0.16	2.1	0.23	0.13	0.13
2012[a]	533,174	4	1.4	30.5	0.39	0.038	0.028	0.028
2012[b]	91,961	8	0.90	0.16	2.1	0.23	0.13	0.13
2014[a]	533,174	4	1.4	30.5	0.39	0.038	0.028	0.028
2014[b]	91,961	8	0.90	0.16	2.1	0.23	0.13	0.13
2015[a]	533,174	4	1.4	30.5	0.39	0.038	0.028	0.028
2015[b]	91,961	8	0.90	0.16	2.1	0.23	0.13	0.13

CO = carbon monoxide
ft^2 = square feet
in = inches
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound

Notes:

a Assumed that the remainder of impervious cover after removing facility space was asphalt paving. Table 2-4: (93-16-15.8) = 61.2 acres, equally divided among the Alternative 2 Action years. It was assumed that hot mix asphalt will be used for all asphalt paved areas. Assumed 4" thickness.

b It was assumed that all new construction would be built upon concrete slab. Assumed 8" thickness. Total Alternative 2 (PDA) construction equally divided among the PDA years.

c Assumed $PM_{2.5} = PM_{10}$.

Table C-10
Summary of Calculation Emission Factors
Altus Air Force Base
Jackson County, Oklahoma

Construction Equipment	Average Construction Equipment Usage Rates[a] (hours): New Construction		Existing Facilities			Paving Operations			Equipment Emission Factors (from AP-42, Volume 2 - Mobile Sources)				
	Single Story (per 1,000 ft^2)	Multi-Story (per 1,000 ft^2)	Single Story (per 1,000 ft^2)	Multi-Story (per 1,000 ft^2)	Demolition (per 1,000 ft^2)	Asphalt (per 1,000 yd^3)	Gravel/Dirt (per 1,000 yd^3)	Concrete (per 1,000 yd^3)	CO (lb/hr)	VOC (lb/hr)	NO_X (lb/hr)	SO_X (lb/hr)	PM_{10} (lb/hr)
Backhoe	2.690	2.194	0.666	0.225	-	-		-	1.794	0.304	1.260	0.137	0.112
Blower	-	-	-	-	-	16.000		-	12.100	0.410	0.320	0.017	0.021
Bulldozer	1.183	1.387	0.372	0.106	-	6.154	6.154	16.000	1.257	0.425	3.840	0.463	0.406
Concrete Truck	7.528	3.764	0.753	0.376	-	-		203.262	1.794	0.304	4.166	0.454	0.256
Crane	10.334	15.545	1.894	1.040	3.000	-		-	0.675	0.018	1.691	0.143	0.139
Dump Truck	4.228	3.401	0.961	0.239	7.960	10.954	40.129	40.129	1.794	0.304	4.166	0.454	0.256
Front-end Loader	2.680	2.518	0.771	0.184	4.000	-	16.000	16.000	0.572	0.291	1.890	0.182	0.172
Paver	-	-	-	-	-	8.000		-	0.675	0.183	1.691	0.143	0.139
Roller	-	-	-	-	-	23.906	23.906	-	0.304	0.083	0.862	0.067	0.050
Scraper	-	-	-	-	-	4.800		-	0.151	0.052	0.713	0.086	0.061
Striper	-	-	-	-	-	16.000		-	12.100	0.410	0.320	0.017	0.021
18-Wheel Truck	28.080	30.055	5.268	2.484	-	-		182.166	1.794	0.304	4.166	0.454	0.256

Pollutant	Construction Equipment Emission Factors: New Construction		Existing Facilities			Paving Operations		
	Single Story (lb/1,000 ft^2)	Multi-Story (lb/1,000 ft^2)	Single Story (lb/1,000 ft^2)	Multi-Story (lb/1,000 ft^2)	Demolition (lb/1,000 ft^2)	Asphalt (lb/1,000 yd^3)	Gravel/Dirt (lb/1,000 yd^3)	Concrete (lb/1,000 yd^3)
CO	86.288	84.385	15.907	6.907	18.594	427.979	96.146	792.713
VOC	14.400	13.588	2.742	1.129	3.639	22.763	21.455	140.825
NO_X	196.431	194.193	36.013	15.714	45.795	117.062	241.654	1,864.549
SO_X	20.968	20.522	3.844	1.670	4.771	11.515	25.581	203.523
PM_{10}	12.877	12.931	2.409	1.038	3.143	8.575	16.719	118.190

VOC Emissions from Asphalt Evaporation (AP-42 Section 4.5)		
Density of Asphalt	68.56	lb/ft^3
Weight Percent of Asphalt which Evaporates	5	%

CO = carbon monoxide
ft^2 = square feet
ft^3 = cubic feet
lb/hr =pounds per hour
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
SO_x = sulfur oxides
yd^3 = cubic yard
a For purposes of analysis, these parameters were estimated using established cost estimating methodologies for construction and experience with similar types of construction projects (Means 1996).
Notes: It has been assumed that hot mix asphalt will be used. VOC evaporative emissions from hot mix asphalt are typically one order of magnitude less than cutback.

Table C-11
PDA - Emissions from Construction POV[a]
Altus Air Force Base
Jackson County, Oklahoma

Car/Light Truck (Exhaust Emissions)

Year	Days worked per year	Total Number of Worker Vehicles	Vehicles Miles Traveled (miles/day)	Vehicles Miles Traveled (miles/yr)	Emission Factors[b]					
					PM_{10} (lb/mile)	$PM_{2.5}$[c] (lb/mile)	NOx (lb/mile)	CO (lb/mile)	SOx (lb/mile)	VOC (lb/mile)
2010	250	5	100	125,000	8.70E-05	8.70E-05	9.18E-04	8.26E-03	1.08E-05	9.14E-04
2011	250	5	100	125,000	8.88E-05	8.88E-05	8.45E-04	8.26E-03	1.08E-05	8.52E-04
2012	250	5	100	125,000	8.98E-05	8.98E-05	7.76E-04	7.65E-03	1.07E-05	7.96E-04
2014	250	5	100	125,000	9.18E-05	9.18E-05	6.55E-04	6.60E-03	1.07E-05	7.02E-04
2015	250	5	100	125,000	9.26E-05	9.26E-05	6.02E-04	6.14E-03	1.07E-05	6.64E-04

Car/Light Truck (Exhaust Emissions Continued)

Year	Emission Rates					
	PM_{10} (ton/yr)	$PM_{2.5}$[c] (ton/yr)	NOx (ton/yr)	CO (ton/yr)	SOx (ton/yr)	VOC (ton/yr)
2010	5.44E-03	5.44E-03	0.057	0.52	6.73E-04	0.057
2011	5.55E-03	5.55E-03	0.053	0.52	6.73E-04	0.053
2012	5.61E-03	5.61E-03	0.048	0.48	6.71E-04	0.050
2014	5.74E-03	5.74E-03	0.041	0.41	6.68E-04	0.044
2015	5.79E-03	5.79E-03	0.038	0.38	6.69E-04	0.041

CO = carbon monoxide
ft^2 = square feet
g/hp-hr = gram per horsepower - hour
hp = horsepower
hr'day = hours per day
hr/yr = hours per year
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
POV = privately owned vehicle
SO_x = sulfur oxides
ton/yr = tons per year
VOC = volatile organic compound
Notes:
a Construction worker private vehicle travel to the work sites on-base. Conservatively assumed every worker vehicle would travel 100 miles per day for 250 days worked each year.
b Highest (Most Conservative) EMFAC2007 (version 2.3). Emission Factors for On-Road Passenger Vehicles (<8,500 lbs). Derived from Peak Emissions Inventory(summer, annual , winter). Source: South Coast Air Quality Management District (SCAQMD).
c Assumed $PM_{2.5}$ = PM_{10}.

Table C-12
PDA - Emission Increase from Altus Personnel POV Emissions
Altus Air Force Base
Jackson County, Oklahoma

Worker Increase	Miles Traveled	Days per Year	Vehicle Miles Traveled (VMT)	Emission Factors[a] (lb/mile)						Total Air Emissions (ton/yr)					
				CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$[b]	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$[b]
426	10	345	1,469,700	6.14E-03	6.64E-04	6.02E-04	1.07E-05	9.26E-05	9.26E-05	4.5	0.49	0.44	7.87E-03	0.068	0.068

CO = carbon monoxide

lb/mile = pounds per mile

NO_x = nitrogen oxides

$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter

PM_{10} = particulate matter equal or less than 10 micrometers in diameter

POV = privately owned vehicle

SO_x = sulfur oxides

ton/yr = tons per year

VOC = volatile organic compound

a Highest (Most Conservative) EMFAC2007 (version 2.3). Emission Factors for On-Road Passenger Vehicles (<8,500 lbs). Derived from Peak Emissions Inventory(summer, annual , winter). Source: South Coast Air Quality Management District (SCAQMD).

b Assumed $PM_{2.5}$ = PM_{10}.

Appendix C - Attachments
Emissions and Dispersion Modeling System (EDMS) Input and Output Printouts

EDMS 5.1 Model Inputs for EDMS EA Model Inputs Study

Study Created:	Mon Feb 23 15:28:01 2009
Report Date:	Mon Feb 23 15:45:36 2009
Study Pathname:	K:\Air Force 12832\AETC\eis\Altus\edms\EA General Plan Based Installation Development\EA General Plan Based Installation Development.edm

Study Setup

Unit System:	Metric
Dispersion Modeling:	Dispersion is not enabled for this study
Speciated Hydrocarbon Modeling:	Speciated Hydrocarbon Modeling is not enabled for this study
Analysis Years:	2008 2009 2010 2011 2012 2013 2014 2015

Scenarios

Scenario Name:	Description:	Add a description.
Baseline	Aircraft Times in Mode Basis:	ICAO/EPA Times in Mode
	Taxi Time Modeling:	User-specified Taxi Times
	FOA3 Sulfur-to-Sulfate Conversion Rate:	2.400000 %

Airports

Airport Name:	Altus Afb
IATA Code:	LTS
ICAO Code:	KLTS
FAA Code:	
Country:	US
State:	Oklahoma
City:	Altus
Airport Description:	Altus Afb
Latitude:	34.667°
Longitude:	-99.267°
Northing:	3836155.42
Easting:	475566.73
UTM Zone:	14
Elevation:	1382.00 feet
PM Modeling Methodology:	FOA3a (Sulfur-to-Sulfate Conversion Rate = 5.0%, Fuel Sulfur Content = 0.068%)

Scenario-Airport: Baseline, Altus Afb

Weather

Baseline, Altus Afb

Mixing Height:	914.40 meters
Temperature:	16.11 °C
Daily High Temperature:	21.86 °C
Daily Low Temperature:	10.36 °C
Pressure:	101320.73 Pa
Sea Level Pressure:	101557.78 Pa
Relative Humidity:	60.09
Wind Speed:	16.91 kph
Wind Direction:	0.00 °
Ceiling:	30480.00 m
Visibility:	80.47 km
The user has used annual averages.	
Base Elevation:	421.23 meters
Date Range:	Thursday, January 01, 2004 to Friday, December 31, 2004
Source Data File Location:	
Upper Air Data File Location:	

Quarter-Hourly Operational Profiles

Baseline, Altus Afb

Name: DEFAULT

Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight	Quarter-Hour	Weight
12:00am to 12:14 am	1.000000	6:00am to 6:14am	1.000000	12:00pm to 12:14 pm	1.000000	6:00pm to 6:14pm	1.000000
12:15am to 12:29 am	1.000000	6:15am to 6:29am	1.000000	12:15pm to 12:29 pm	1.000000	6:15pm to 6:29pm	1.000000
12:30am to 12:44 am	1.000000	6:30am to 6:44am	1.000000	12:30pm to 12:44 pm	1.000000	6:30pm to 6:44pm	1.000000
12:45am to 12:59 am	1.000000	6:45am to 6:59am	1.000000	12:45pm to 12:59 pm	1.000000	6:45pm to 6:59pm	1.000000
1:00am to 1:14am	1.000000	7:00am to 7:14am	1.000000	1:00pm to 1:14pm	1.000000	7:00pm to 7:14pm	1.000000
1:15am to 1:29am	1.000000	7:15am to 7:29am	1.000000	1:15pm to 1:29pm	1.000000	7:15pm to 7:29pm	1.000000
1:30am to 1:44am	1.000000	7:30am to 7:44am	1.000000	1:30pm to 1:44pm	1.000000	7:30pm to 7:44pm	1.000000
1:45am to 1:59am	1.000000	7:45am to 7:59am	1.000000	1:45pm to 1:59pm	1.000000	7:45pm to 7:59pm	1.000000
2:00am to 2:14am	1.000000	8:00am to 8:14am	1.000000	2:00pm to 2:14pm	1.000000	8:00pm to 8:14pm	1.000000
2:15am to 2:29am	1.000000	8:15am to 8:29am	1.000000	2:15pm to 2:29pm	1.000000	8:15pm to 8:29pm	1.000000
2:30am to 2:44am	1.000000	8:30am to 8:44am	1.000000	2:30pm to 2:44pm	1.000000	8:30pm to 8:44pm	1.000000
2:45am to 2:59am	1.000000	8:45am to 8:59am	1.000000	2:45pm to 2:59pm	1.000000	8:45pm to 8:59pm	1.000000
3:00am to 3:14am	1.000000	9:00am to 9:14am	1.000000	3:00pm to 3:14pm	1.000000	9:00pm to 9:14pm	1.000000
3:15am to 3:29am	1.000000	9:15am to 9:29am	1.000000	3:15pm to 3:29pm	1.000000	9:15pm to 9:29pm	1.000000
3:30am to 3:44am	1.000000	9:30am to 9:44am	1.000000	3:30pm to 3:44pm	1.000000	9:30pm to 9:44pm	1.000000
3:45am to 3:59am	1.000000	9:45am to 9:59am	1.000000	3:45pm to 3:59pm	1.000000	9:45pm to 9:59pm	1.000000
4:00am to 4:14am	1.000000	10:00am to 10:14am	1.000000	4:00pm to 4:14pm	1.000000	10:00pm to 10:14pm	1.000000
4:15am to 4:29am	1.000000	10:15am to 10:29am	1.000000	4:15pm to 4:29pm	1.000000	10:15pm to 10:29pm	1.000000
4:30am to 4:44am	1.000000	10:30am to 10:44am	1.000000	4:30pm to 4:44pm	1.000000	10:30pm to 10:44pm	1.000000
4:45am to 4:59am	1.000000	10:45am to 10:59am	1.000000	4:45pm to 4:59pm	1.000000	10:45pm to 10:59pm	1.000000
5:00am to 5:14am	1.000000	11:00am to 11:14am	1.000000	5:00pm to 5:14pm	1.000000	11:00pm to 11:14pm	1.000000
5:15am to 5:29am	1.000000	11:15am to 11:29am	1.000000	5:15pm to 5:29pm	1.000000	11:15pm to 11:29pm	1.000000
5:30am to 5:44am	1.000000	11:30am to 11:44am	1.000000	5:30pm to 5:44pm	1.000000	11:30pm to 11:44pm	1.000000
5:45am to 5:59am	1.000000	11:45am to 11:59am	1.000000	5:45pm to 5:59pm	1.000000	11:45pm to 11:59pm	1.000000

Daily Operational Profiles

Baseline, Altus Afb

Name: DEFAULT

Day	Weight	Day	Weight
Monday	1.000000	Friday	1.000000
Tuesday	1.000000	Saturday	1.000000
Wednesday	1.000000	Sunday	1.000000
Thursday	1.000000		

Monthly Operational Profiles

Baseline, Altus Afb

Name: DEFAULT

Month	Weight	Month	Weight
January	1.000000	July	1.000000
February	1.000000	August	1.000000
March	1.000000	September	1.000000
April	1.000000	October	1.000000
May	1.000000	November	1.000000
June	1.000000	December	1.000000

Aircraft

Baseline, Altus Afb

Default Taxi Out Time: 19.000000 min

Default Taxi In Time: 7.000000 min

Year:	Uses Schedule?	Schedule Filename:
2008	No	(None)
2009	No	(None)
2010	No	(None)
2011	No	(None)
2012	No	(None)
2013	No	(None)

2014	No	(None)
2015	No	(None)

Aircraft Name:
Boeing C-17A
Engine Type:
F117-PW-100
Identification:
#1
Category:
HMJC

Take Off weight:	138346.00 Kgs
Approach Weight:	105324.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2008

Annual Departures:	2462
Annual Arrivals:	2462
Annual TGOs:	0
Taxi Out Time:	19.000000 min
Taxi In Time:	7.000000 min

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Year:
2009

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	0
Taxi Out Time:	19.000000 min
Taxi In Time:	7.000000 min

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Year:
2010

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	0
Taxi Out Time:	19.000000 min
Taxi In Time:	7.000000 min

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT

	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2011	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	19.000000 min
	Taxi In Time:	7.000000 min
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2012	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	19.000000 min
	Taxi In Time:	7.000000 min
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2013	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	19.000000 min
	Taxi In Time:	7.000000 min
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2014	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	19.000000 min
	Taxi In Time:	7.000000 min
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT

Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Year:
2015

Annual Departures:	3865
Annual Arrivals:	3865
Annual TGOs:	0
Taxi Out Time:	19.000000 min
Taxi In Time:	7.000000 min

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Aircraft Name:
Boeing KC-135 Stratotanker
Engine Type:
F108-CF-100
Identification:
#1
Category:
HMJC

Take Off weight:	129274.00 Kgs
Approach Weight:	92986.00 Kgs
Glide Slope:	3.00°
APU Assignment:	None
APU Departure OP Time:	13.00 min
APU Arrival OP Time:	13.00 min
Gate Assignment:	None

Assigned GSE/AGE:	FUEL	Arrival Op Time (mins)	Departure Op Time (mins)	Horsepower (hp)	Load Factor (%)	Manufactured Year
Cart (Taylor Dunn)	Diesel	5.00	5.00	25.00	50.00	
Generator (Generic)	Diesel	0.00	120.00	158.00	82.00	
Lift (Generic)	Diesel	5.00	5.00	115.00	50.00	
Other (Generic)	Diesel	0.00	0.00	140.00	50.00	

Year:
2008

Annual Departures:	3600
Annual Arrivals:	3600
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational profile:	DEFAULT
Departure Daily Operational Profile:	DEFAULT
Departure Monthly Operational Profile:	DEFAULT
Arrival Quarter-Hourly Operational profile:	DEFAULT
Arrival Daily Operational Profile:	DEFAULT
Arrival Monthly Operational Profile:	DEFAULT
Touch & Go Quarter-Hourly Operational profile:	DEFAULT
Touch & Go Daily Operational Profile:	DEFAULT
Touch & Go Monthly Operational Profile:	DEFAULT

Year:
2009

Annual Departures:	0
Annual Arrivals:	0
Annual TGOs:	0
Taxi Out Time:	Determined by Sequencing model
Taxi In Time:	Determined by Sequencing model

Departure Quarter-Hourly Operational	DEFAULT

	profile:	
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2010	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2011	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2012	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2013	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model

	Taxi In Time:	Determined by Sequencing model
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2014	Annual Departures:	0
	Annual Arrivals:	0
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT
Year: 2015	Annual Departures:	5652
	Annual Arrivals:	5652
	Annual TGOs:	0
	Taxi Out Time:	Determined by Sequencing model
	Taxi In Time:	Determined by Sequencing model
	Departure Quarter-Hourly Operational profile:	DEFAULT
	Departure Daily Operational Profile:	DEFAULT
	Departure Monthly Operational Profile:	DEFAULT
	Arrival Quarter-Hourly Operational profile:	DEFAULT
	Arrival Daily Operational Profile:	DEFAULT
	Arrival Monthly Operational Profile:	DEFAULT
	Touch & Go Quarter-Hourly Operational profile:	DEFAULT
	Touch & Go Daily Operational Profile:	DEFAULT
	Touch & Go Monthly Operational Profile:	DEFAULT

GSE Population

Baseline, Altus Afb

None.

Parking Facilities

Baseline, Altus Afb

None.

Roadways

Baseline, Altus Afb

None.

Stationary Sources

Baseline, Altus Afb

None.

Training Fires

Baseline, Altus Afb

None.

Gates

Baseline, Altus Afb

None.

Taxiways
Baseline, Altus Afb

None.

Runways
Baseline, Altus Afb

None.

Taxipaths
Baseline, Altus Afb

None.

Configurations
Baseline, Altus Afb

None.

Buildings
Baseline, Altus Afb

None.

Discrete Cartesian Receptors
Baseline, Altus Afb

None.

Discrete Polar Receptors
Baseline, Altus Afb

None.

Cartesian Receptor Networks
Baseline, Altus Afb

None.

Polar Receptor Networks
Baseline, Altus Afb

None.

User-Created Aircraft
Baseline, Altus Afb

None.

User-Created GSE
Baseline, Altus Afb

None.

User-Created APU
Baseline, Altus Afb

None.

```
# EDMS 5.1 Emissions Inventory Report
# Emissions Inventory Summary
# Study: EDMS EA Model Inputs
# Scenario - Airport: Baseline - Altus Afb
# Year: 2008
# Units: Short Tons per Year
# Generated: 02/23/09 15:46:12

# Category; CO2; CO; THC; NMHC; VOC; TOG; NOx; SOx; PM-10; PM-2.5;
Aircraft; 47623.215; 184.223; 10.199; 11.792; 11.730; 11.792; 183.075; 19.502; N/A; N/A;
GSE; N/A; 3.014; N/A; 0.844; 0.903; 0.917; 11.045; 0.206; 0.620; 0.601;
APUs; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Parking Facilities; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Roadways; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Stationary Sources; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Training Fires; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Grand Total; 47623.215; 187.238; 10.199; 12.635; 12.633; 12.709; 194.120; 19.708; 0.620; 0.601;
```

```
# EDMS 5.1 Emissions Inventory Report
# Emissions Inventory Summary
# Study: EDMS EA Model Inputs
# Scenario - Airport: Baseline - Altus Afb
# Year: 2015
# Units: Short Tons per Year
# Generated: 02/23/09 15:46:12

# Category; CO2; CO; THC; NMHC; VOC; TOG; NOx; SOx; PM-10; PM-2.5;
Aircraft; 74765.212; 289.221; 16.011; 18.512; 18.416; 18.512; 287.410; 30.617; N/A; N/A;
GSE; N/A; 2.485; N/A; 0.783; 0.838; 0.852; 9.886; 0.009; 0.595; 0.578;
APUs; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Parking Facilities; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Roadways; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Stationary Sources; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Training Fires; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A; N/A;
Grand Total; 74765.212; 291.706; 16.011; 19.296; 19.254; 19.364; 297.296; 30.626; 0.595; 0.578;
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General Plan

Altus Air Force Base

Oklahoma

Air Education and
Training Command

PREPARED BY BLACK & VEATCH

A L T U S   A I R   F O R C E   B A S E

General Plan

Altus Air Force Base, Oklahoma

97th Air Mobility Wing

Air Education and Training Command

PREPARED BY

BLACK & VEATCH

January 2003

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Section 1.0

Introduction

1.1 PURPOSE AND SCOPE

The General Plan provides the Installation Commander and other decision-makers a picture of Altus Air Force Base's present and future capability to support its mission with its physical assets and delivery systems. It is a concise, stand-alone document, summarizing information from a variety of sources. It serves as a guide for site specific future development and provides general background information in land use growth patterns. Its illustrative format provides decision-makers with an understanding of the character and structure of the installation.

C-17s

The development of the General Plan is a participatory process involving key personnel at the installation. This plan reflects the goals and objectives for future development established by key decision-makers at Altus Air Force Base (AFB).

97th Air Mobility Wing Headquarters

Space Shuttle Departing Altus AFB

1.2 COMPREHENSIVE PLANNING PROCESS

The comprehensive planning process enables a commander and other staff members to logically and comprehensively analyze a variety of factors affecting the improvement and development of the base. The process allows for the creation and evaluation of alternative approaches and solutions by identifying opportunities and boundaries for development decision-making.

Comprehensive planning "…incorporates Air Force programs, such as operational, environmental, urban planning, and others, to identify and assess development alternatives and ensure compliance with applicable federal, state and local laws, regulations and policies." It is, "The ongoing, iterative, participatory process addressing the full range of issues affecting or affected by an installation's development." (AFI 32-7062)

In past years, the Air Force required each installation to develop a Base Comprehensive Plan (BCP). These BCPs contained detailed information and plans addressing all areas affecting development on an installation. In response to a directive on environmental quality and stewardship, the Air Force has now established the requirement for a General Plan. This plan is narrower in scope than the BCP and relies primarily on detailed information contained in component plans, element plans, and maps. The General Plan is the only comprehensive planning document required for Air Force installations.

In July 2002, Air Education and Training Command (AETC) issued a policy on Commander endorsement of base General Plans. This policy states that each base "…must plan and work with a vision in mind." Each base is to keep their General Plan current and develop a long-range vision — a 2030 Plan for the base. This AETC policy is found in Appendix D.

1.3 BASE DEVELOPMENT GOALS

Eight fundamental goals for installation development guide the planning activities of Air Education and Training Command (AETC) bases. These goals are to:

- provide maximum operational support and to be prepared to perform missions as assigned;
- ensure the protection, supply, use, and management of human, financial, environmental, and constructed resources;
- promote public health, safety, welfare, and overall quality of life;
- promote compatible land use development near airfields in a manner that will limit restrictions to base operations while protecting adjacent communities;
- provide an effective, orderly, and obtainable direction for future development;
- promote an efficient traffic flow pattern between functionally related land uses;
- enhance the base visual and aesthetic resources; and
- collocate or consolidate activities that are functionally related in an effort to improve operational efficiency.

1.4 GOALS OF THE GENERAL PLAN

The overall goals of the General Plan are to provide a framework for planning, programming, design, construction, and effective resource management. These goals are as follows:

- Effective, orderly long-range development of the installation in support of existing and future missions.
- A comprehensive procedure for translating mission plans to policies, programs, and specific projects for on-base facilities and systems.
- A framework for integrating coherently the multiple components of base comprehensive planning.
- A complementary and harmonious relationship between the base and the civilian community, brought about and maintained through cooperative community planning.
- The basis for developing a capital improvement plan, including guidelines for the siting of facilities.
- Wise protection, use, and management of resources within the natural and man-made environments.
- The highest possible quality of life for the Air Force community.

Altus AFB and Surrounding Area from the North

1.5 PLAN APPROACH

Section 2, Altus AFB 2030 Plan, highlights the recently developed area development plans to guide the base into a well planned, sustainable future.

Section 3, Installation and Vicinity Profile, provides the characteristics of the installation and its regional setting. The mission of the host unit and major associate units are described. These missions are the standard for evaluating existing conditions, confirming current plans, and implementing new plans.

Section 4, General Plan – Component Plan Overview, summarizes the analyses, major findings, and recommendations of the component plans.

- Constraints and Opportunities (natural/cultural/man-made resources, environmental quality, noise, safety).
- Infrastructure (utility systems, communications, pavements).
- Land Use and Transportation (installation layout/vicinity, transportation, architectural compatibility, landscape development).
- Capital Improvements (facility programs).

Section 5, General Plan Maintenance and Revision, addresses the importance of keeping this document current and vital.

The appendices provide references, acronyms and abbreviations, acknowledgment of the participants in this planning process, AETC policy on General Plans, and Altus AFB design principles.

C-17 Globemaster at Takeoff

1.6 ROLES AND RESPONSIBILITIES

The 97th Air Mobility Wing Commander is responsible for ensuring that comprehensive plans are developed and maintained to assist in the best development of Altus AFB.

The Base Civil Engineer is responsible for the implementation of comprehensive plans.

The AETC Civil Engineer ensures that the comprehensive plan documents are completed and maintained, and oversees the implementation. In addition, the staff reviews the plans for consistency and adequacy and ensures compliance with a variety of government requirements.

1.7 IMPLEMENTATION STRATEGY OF THE GENERAL PLAN

The Base Civil Engineer, who is responsible for the General Plan implementation, will undertake these basic strategies:

- Convey the intent and importance of the General Plan to all who influence base development.
- Optimize the existing processes for investing in construction, demolition, and maintenance.
- Monitor the base's capital improvements program to ensure incorporation of the General Plan's recommendations.

The development of the General Plan was made possible through the contributions of those individuals who are acknowledged in Appendix C. Future involvement of these people is essential to the orderly development of Altus AFB.

Section 2.0 Altus AFB 2030 Plan

Altus AFB is ideal for flying training missions as it has unrestricted air space, ideal flying weather, and no encroachment. Since its beginning in 1942, Altus AFB has seen many changes and again change is affecting the base. Currently, Air Mobility Command (AMC) trains aircrews for the C-5, C-17, and KC-135 aircraft which requires a variety of operation, training, housing, and community facilities. Many of these existing facilities are over 60 years old and deteriorating.

The AMC initiative to increase the number of C-17 aircraft and possibly decrease the number of C-5 aircraft at Altus AFB directly affects the future development of base facilities. A plan to take Altus AFB into the future has been developed to meet the changes in mission and to posture the base for new missions – the *2030 Plan.*

The *Altus AFB 2030 Plan* moves Altus AFB toward the future–replenishing the combat capability of America's Air Force. This comprehensive and inspired plan outlines the steps to be taken to bring the base into the twenty-first century as a premier, well-planned, functioning training base.

The *2030 Plan* was developed by an Air Force Center for Environmental Excellence (AFCEE) Assistance Team in August 2002 with input from base leadership. The Assistance Team's task was to develop a long-range concept plan for Altus AFB that integrated airlift and tanker training into a coherent flying training

Altus AFB Main Gate

Traffic Circle Static Display

campus and to provide a product that could be integrated into the General Plan.

The *2030 Plan* intent is to articulate the Altus AFB vision for future development as prescribed in the HQ AETC planning policy letter Commander Endorsement of Base General Plans dated 29 July 2002. This AETC policy letter is found in Appendix D. The *2030 Plan* gives the base the opportunity to support sustainable planning principles and the development of a quality Air Force living environment.

Working with key base personnel, the AFCEE Assistance Team developed sustainable design principles to guide the leadership in creating a professional base image that is mission oriented and developed the design vision used in the preparation of the area development plans. The design principles are classified into three interrelated categories: places, architecture, and circulation, and are found in Appendix E.

The *2030 Plan* carefully considered land use compatibility, facility consolidation, mission sustainability, quality of life, and safety and security. Four area development plans were developed that fostered efficiency in the workplace and created a positive professional image for Altus AFB mission and its people. The locations of the *2030 Plan* areas are shown in Figure 2.1. They include Wing Headquarters Campus, Air Mobility Training Campus, Central Base Recreation Campus, and North Ramp Expansion.

The *2030 Plan* is dynamic long-range development tool used to promote installation excellence through the articulation of mission goals. It is a continuous process and constant challenge which requires leadership commitment to preserving resources and environmental stewardship, and an awareness of current development decision's impact on the long-range vision.

2.1 WING HEADQUARTERS CAMPUS

The Wing Headquarters Campus is envisioned as the centerpiece for base missions. The Wing Headquarters Campus builds on the beauty and history of the parade ground. New facilities are located around the parade ground to provide definition and interest at its edges. This plan provides a formal, free-flowing pedestrian environment that links the installation core area with surrounding uses.

The new Wing Headquarters is sited in a most fitting location at the west end of the parade ground, creating hierarchy for base development. The Wing Commander's office on the fourth floor has a commanding view of the base cantonment and flightline areas. To accommodate this siting the NBC satellite bank is relocated to the Base Exchange in the community center area.

Four new three-story buildings flank the parade ground to the north and south: Collocated Club and Lodging Facility, 65-room Lodging Facility, 80-room Lodging Facility, and Consolidated Education and Learning Center. A fifth building is sited for future development. This visionary and efficient layout enhances quality of space and centralizes base functions.

New facilities are designed and sited to meet force protection standards. Landscaping and attractive site furnishings create physical protective barriers within the campus setting. A major troopwalk between the Fitness Center, Bowling Center, and Chapel provides access and a pleasant walk from the Air Mobility Training Campus to the Dining Facility located within the Central Base Recreation Campus.

"Parking parks" are designed with light-colored surface pavements and wide medians to support shade trees located along the campus perimeter. This reduces the effect of urban "heat islands."

The Wing Headquarters Campus area development plan is illustrated in Figure 2.2.

View of Parade Grounds, Wing Headquarters Campus, Facing North

2.2 AIR MOBILITY TRAINING CAMPUS

The Air Mobility Training Campus brings all student housing into one area, which is within walking distance of all flying training facilities. Focusing on circulation, accessibility, and sustainability, the Air Mobility Training Campus provides a distinct, environmentally-sensitive, urban planning solution to some complex site issues.

Air Mobility Training Campus, Looking West

The existing campus area is overburdened with excessive streets and parking pavements, and lacks an organized landscape scheme. In the design of this campus priority is given to street closings and the elimination of parking lots to ensure that pedestrian spaces, not cars, dominate the campus setting. The removal of parking lots opens up areas for new lodging facilities and dormitories. The siting of these new student housing facilities provides “quad” areas for recreation, relaxation, assembly, and easy circulation. The quads incorporate a variety of common architectural elements to stimulate social interaction and help create a cohesive campus setting.

The northwestern portion of Sixth Street is closed to vehicular traffic, paved with brick pavers, and tree-lined to create a central pedestrian spine between the living and training areas. Troopwalks provide easy access from the Dinning Facility to the training campus area. The troopwalks can accommodate emergency vehicles and service vehicles. “Parking parks” provide shade trees within medians to make parking lots more tolerable in the heat.

This campus plan creates development opportunities on the east and along the flightline for a new Squadron Operations Facility, housing two C-17 and one C-5 squadrons, and a Base Operations Facility.

New facilities are sited to meet force protection standards. Landscaping and site furnishings create physical protective barriers within the campus setting.

Two major areas are available along the northeast perimeter to support future mission growth.

The Air Mobility Training Campus area development plan is illustrated in Figure 2.3.

2.3 CENTRAL BASE RECREATION CAMPUS

Altus AFB's commitment to improving the quality of life for personnel and their families requires a continuous and comprehensive improvement program to remove and replace energy inefficient, substandard facilities. Enormous opportunities present themselves with the removal of substandard unaccompanied housing facilities located northeast of the traffic circle. A world-class, centrally located, recreation campus can be developed. New facilities include tennis courts, softball fields, football field and running track, volleyball courts, basketball courts, check-out facility, and bathrooms.

This recreation campus provides recreational amenities for the main base and the Air Mobility Training Campus. The new recreation campus location provides a unique and inviting focal element at the base main entrance.

Landscaping elements create quality views and vistas, define street hierarchy, add visual relief to the flat site, and help to define land use zone edges and entries. Landscape elements include earth berms, tree groves, low maintenance indigenous shrub beds, and site furniture amenities that are compatible with the base architectural theme.

A large open green area is reserved at the east perimeter of the Central Recreation Campus to support future dormitory expansion.

The Central Base Recreation Campus area development plan is illustrated in Figure 2.4.

Central Base Recreation Campus Area

2.4 NORTH RAMP EXPANSION

Preserving and expanding the flying mission capability is an important and critical development goal at Altus AFB. The North Ramp Expansion Plan extends the north ramp by adding 110,000 square-yards of paving for parking 18 C-17s, as well as parking for the NASA 747 with its space shuttle. The current ramp cannot accommodate C-17s without violating airfield safety criteria. The new ramp expansion allows for pull-in/pull-out aircraft parking configuration. The majority of the KC-135s remain in their present location, except for two aircraft relocated to the south ramp because they currently violate airfield safety criteria.

The plan also provides sites for two, two-bay aircraft hangars and a Consolidated Aircraft Maintenance Unit and Supply Facility to support the new ramp.

Expanding the north ramp would require the construction of two new golf course holes and the redesign of three existing holes, realignment of the jogging path, and other minor improvements to golf course layout. The golf course remains 72 par.

The North Ramp Expansion area development plan is illustrated in Figure 2.5.

2.5 IMPLEMENTATION STRATEGY OF THE 2030 PLAN

The 97th Wing Commander, who is responsible for the *2030 Plan* implementation, will undertake these basic strategies:

- Convey the intent and importance of the plan to all who influence base development.
- Utilize the plan to format demolition and recapitalization initiatives.
- Utilize the plan as the foundation for future development, realizing it is a flexible tool to be revisited with any proposed change to mission or direction.
- Keep the end product in mind – good, well-planned, functional facilities in 2030.

North Ramp Expansion Area

Section 3.0

Installation and Vicinity Profile

3.1 INSTALLATION'S MISSION STATEMENT

Altus AFB is under the Air Education and Training Command. This base plays a unique role within the Air Force by housing the United States Air Force's primary Air Mobility Training Center (AMTC) and the 97th Air Mobility Wing (AMW). The AMTC trains pilots, navigators, flight engineers, loadmasters, and instructors using three different airframes: C-5, C-17, and KC-135. This requires a special assortment of operations, training, housing, and community facilities to meet the complex needs of the AMC training and mobilization mission.

3.2 97TH AIR MOBILITY WING

The 97th Air Mobility Wing (97th AMW) operates the AETC's strategic airlift and aerial refueling flying training schools and maintains and supports C-5, C-17, and KC-135 aircraft. The wing maintains operational currency of a highly-qualified instructor force and combat-ready aircrew members, so they can deploy to augment worldwide contingencies. The 97th AMW maintains mobility positions, available for immediate worldwide deployment, and acts as wartime aerial port of embarkation for the U.S. Army, Fort Sill, Oklahoma.

C-5 At Sunset

C-17 Globemaster Cargo

The mix of aircraft is changing at Altus AFB. Headquarters, Air Mobility Command (AMC) has been authorized to purchase 60 additional C-17 aircraft bringing the total fleet size to 180 aircraft. HQ AMC is also pursuing an initiative to increase the C-17 fleet to 222 aircraft. To support the current requirement of 180 C-17 aircraft, five additional aircraft (15 total) are necessary at Altus AFB. If the fleet grows to 222 aircraft, 18 will be required. The 97th AMW can expect each additional C-17 arriving approximately one year apart until acquiring a total of 15 or 18 aircraft. There is also the possibility of a decrease in the number of C-5 aircraft at Altus AFB, and consequently the mission to train C-5 aircrew.

3.2.1 97th Operations Group

The 97th Operations Group plans and executes C-5, C-17, and KC-135 formal school initial and advanced specialty training programs for up to 3,000 students annually. The group sustains C-5, C-17, and KC-135 airland, airdrop, and air refueling mobility forces providing global reach for combat and contingency operations. They also provide air traffic control and weather forecasting for flying operations.

Six squadrons make up the 97th Operations Group:

- **<u>54th Air Refueling Squadron</u>** – is the formal Combat Crew Training School (CCTS) and Central Flight Instructor Course (CFIC) for C/KC-135 aircrew training. Over 80 select aircrew instructors train up to 600 C/KC-135 students annually in 22 courses for Air Force (AF), Air National Guard (ANG), Air Force Reserve Command (AFRC), and international customers. They are also the AETC training cadre for Pacer CRAG (PC) Block 40 modification and support peacetime and contingency missions.
- **<u>55th Air Refueling Squadron</u>** – is the formal CCTS and CFIC for C/KC-135 aircrew training. Over 80 select aircrew instructors train up to 600 C/KC-135 students annually in 22 courses for AF, ANG, AFRC, and international customers. They are also the AETC training cadre for PC Block 40 modification and support peacetime and contingency missions.
- **<u>56th Airlift Squadron</u>** – is the only formal C-5 CCTS providing initial and advanced flight qualification. Over 65 select aircrew instructors train and produce up to 550 crew members annually in nine different curricula including airland and aerial refueling for AMC, AFRC, and ANG. They provide airlift support for peacetime, contingency, and humanitarian operations.
- **<u>58th Airlift Squadron</u>** – is the only formal C-17 CCTS providing pilot and loadmaster initial worldwide mission qualification and advanced upgrades for AF and AFRC units. Over 70 select instructors manage nearly 9,700 flying hours to graduate over 1,000 students per year in 16 courses including airdrop and air refueling. They also support peacetime and contingency operations.

Air Refueling C-17 Globemaster

Load Master Training

C-5 Galaxy Simulator Cockpit

- **97th Operations Support Squadron** – manages the wing's $84 million, 27,000 flying-hours program for over 300 instructors and 3,000 C-5, C-17, and KC-135 students annually. They provide direct support to four flying squadrons and operate six flights including airfield operations, current operations, life support, tactics, intelligence, and weather. The squadron is one of only three Air Force units conducting airfield operations officer training.
- **97th Training Squadron** – manages the wing's $480 million contracted aircrew training for over 300 assigned instructors and up to 3,000 C-5, C-17, and KC-135 students annually. The squadron supervises students from USAF, AFRC, ANG, and allied partners. They provide quality assurance of over 40 training syllabi and oversight of 22 training devices. The squadron is the liaison between 97th Operations Group and over 305 civilian contractors.

Air Traffic Control

3.2.2 97th Mission Support Group

The 97th Mission Support Group directs the support of $4.8 billion in aircraft and infrastructure for a population of 10,000. They provide communications, engineering, recreation, force protection, security, law enforcement, family support, professional military education and off-duty education, civilian and military personnel support, disaster response, information management, environmental management, housing, lodging, and food services. The group executes a $34 million annual budget.

Seven squadrons make up the 97th Mission Support Group:

- **97th Services Squadron** – supports the 97th AMW aircrew training mission through lodging, fitness, and subsistence programs. They enhance the wing quality of life for the Altus AFB community through programs that promote community welfare and enrich lifestyles. The squadron plans and employs Prime Readiness in Base Services resources for peacetime and wartime contingencies.

Children's Playroom, Fitness Center

- **97th Civil Engineer Squadron** – designs, constructs, acquires, operates, maintains, and repairs real property assets, managing $420 million of facilities and utilities for a population of 10,000. The squadron provides related engineering, environmental, fire protection, and rescue services. They also manage 970 family housing units. They plan and employ Prime Base Engineer Emergency Force for peacetime and wartime contingencies.

Weight Room, Fitness Center

- **97th Mission Support Squadron** – provides personnel and readiness support for all military members and federal career civil service employees assigned to the 97th AMW and associate units. The squadron provides college degree programs and student services, implements enlisted professional military education curriculum through the Airman Leadership School, and oversees First Term Airmen Center. They are the focal point for family services and support programs.
- **97th Security Forces Squadron** – secures C-5, C-17, and KC-135 aircraft and base infrastructure worth $4.8 billion and provides force protection for a populace of 10,000. The squadron maintains capability for immediate, world-wide troop deployment for protection and security of combat resources and provides information security, combat arms training, and law enforcement for the base. They also field military working dog resources for drug and explosives detection.
- **97th Communications Squadron** – provides, operates, and maintains advanced communication and information management systems, air traffic control systems, navigational aids, mobile radios, telephone operations and base-wide communications, and computer network control. They conduct infrastructure planning, visual information support and communications, and information security programs.
- **97th Contracting Squadron** – contributes to mission success by providing efficient and effective operational and contingency acquisition and performance management services. This squadron executes $30 million in contracts annually.
- **97th Logistics Readiness Squadron** – provides overall direction for base logistics processes related to vehicles, cargo movement, passenger movement, personal property, supplies, equipment, deployment planning and operations, fuels, and when appropriate, logistics plans. They control assets over $180 million.

C-5s on the Altus Flightline

Acceptance Inspection of C-17 Engine

3.2.3 97th Maintenance Directorate

The 97th Maintenance Directorate provides quality maintenance and supports all C-5, C-17, KC-135, transient aircraft, engines, and associated ground equipment. They provide complete backshop support while continuously improving environmental awareness and effectively managing maintenance resources, thereby enabling the 97th AMW to perform its aircrew training mission.

Five divisions make up the 97th Maintenance Directorate:

- **97th Tanker Aircraft Division** – provides aircrew customers safe, reliable, quality aircraft to support the world's largest KC-135 Tanker flying training operation, and support "Real World" mission readiness. They provide sound maintenance, inspections, and transient alert service.
- **97th Airlift Aircraft Division** – provides quality maintenance to support all C-5 and C-17 aircraft and associated ground equipment. The division provides complete flight line maintenance and Isochronal Inspection and Home Station Check inspections.
- **97th Component Repair Division** – provides top quality component repair of C-5, C-17, and KC-135 aircraft in fuel systems, hydraulics, alternate mission equipment, wheel and tires, avionics, precision measurement equipment laboratory, and survival equipment.
- **97th Equipment Maintenance Division** – provides quality repair, modification, refurbishment, local manufacture, and inspection of C-5, C-17, and KC-135 aircraft structures and components.
- **97th Maintenance Operations Division** – provides the aircraft maintenance operational support and resource capability tools used for planning, executing, and sustaining C-5, C-17, and KC-135, and transient aircraft during mission flying operations and aircraft maintenance.

3.2.4 97th Medical Group

The 97th Medical Group ensures maximum wartime readiness and combat capability by promoting the health, safety, and morale of active duty personnel. The medical staff trains, mobilizes, and provides medical services in support of contingency operations worldwide. They develop and operate a prevention-oriented, cost-effective managed healthcare system for over 9,500 beneficiaries, increasing wellness in the local community.

The group consists of the following two squadrons:

- **97th Medical Support Squadron** – provides the 97th Medical Group staff and 9,500 healthcare beneficiaries with medical administrative and ancillary services. The squadron is responsible for four flights: business operations and beneficiary services, medical logistics, information systems management, and diagnostic and therapeutic. They execute a $4.2 million annual budget. They support readiness missions of the group and the 97th AMW.
- **97th Medical Operations Squadron** – provides quality, cost-effective healthcare to 9,500 eligible beneficiaries through comprehensive state-of-the-art medical care delivery. Their services include family practice, flight medicine, obstetrics, behavioral health, pediatric, dental, and optometry clinics. The squadron maintains environmental safety and delivers public health services, promotes health and wellness, and ensures wartime readiness of base personnel.

97th Medical Group On Parade Ground

C-17 Globemaster

3.3 MAJOR ASSOCIATE UNITS

3.3.1 Detachment 2, Air Mobility Command Air Operations School

The Det. 2, AMCAOS provides lead staff for DoD air refueling and mobility and civil airlift systems, which includes training, evaluation, command and control, Single Integrated Operations Plan and Operations Plan development, aeromedical evacuation, special operations, tactics, aerial ports, weather, airfield management, and Presidential airlift. The detachment formulates policy to execute Presidential and Secretary of Defense Plans for use of national mobility assets during war, crisis, and Joint Chief of Staff exercises to support unified commander in chiefs.

3.3.2 Air Force Office of Special Investigations, Detachment 422

The AFOSI, Det. 422 delivers special investigative services to protect Air Force and DoD people and operations.

3.3.3 Flight Safety Service Corp

The Flight Safety Service Corp provides total training systems, training systems management and integration services, training delivery, and contractor logistics support to the U.S. Government, prime government contractors, and commercial entities.

3.3.4 Boeing C-17 Aircrew Training System

The Boeing C-17 Aircrew Training System produces C-17-qualified pilots, loadmasters, and engine-run technicians guaranteed to pass Air Force evaluations.

3.3.5 Boeing C-17 Field Services

The Boeing C-17 Field Services helps the wing achieve customer satisfaction by providing world class field services and support.

Altus AFB and Surrounding Area from the North

3.4 GEOGRAPHIC LOCATION

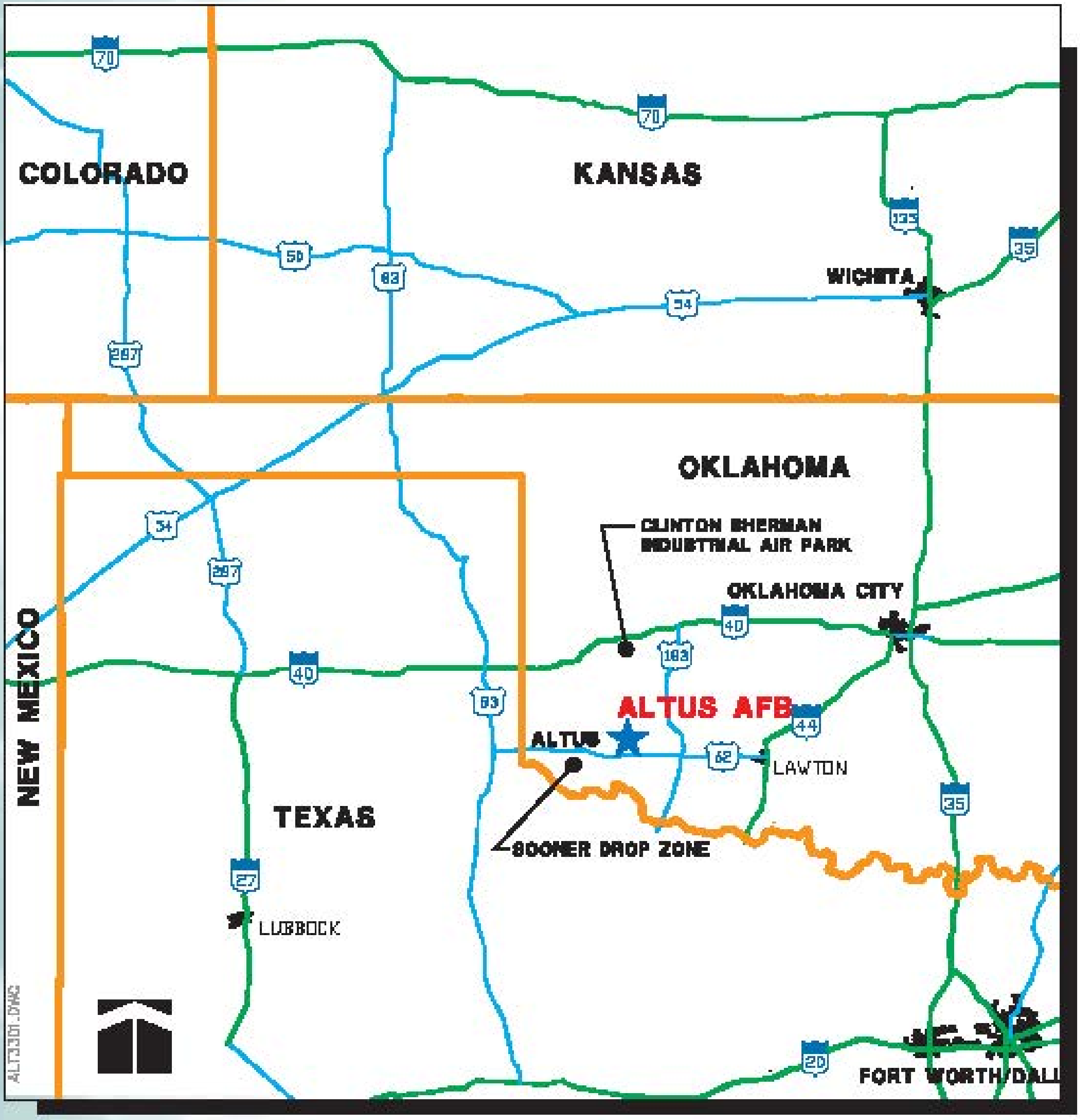
The City of Altus is located approximately 60 miles west of Lawton, 140 miles southwest of Oklahoma City and about 15 miles north of the Oklahoma/Texas border, as illustrated in Figure 3.1. Altus is the county seat of Jackson County and is easily accessible from the north and south by US Highway 283 and from the east and west by US Highway 62.

Altus AFB is located within Altus' city limits. As shown in Figure 3.2, is located on the east side of the city.

The Sooner Drop Zone, shown in Figure 3.1, is located approximately 25 miles southwest of Altus. This site, is owned by Altus AFB, and used for aircrews to practice aerial pallet drops of simulated cargo loads. The base also has use of the Clinton-Sherman Industrial Air Park, located 45 miles to the north, as an alternative runway for aircraft touch and go's.

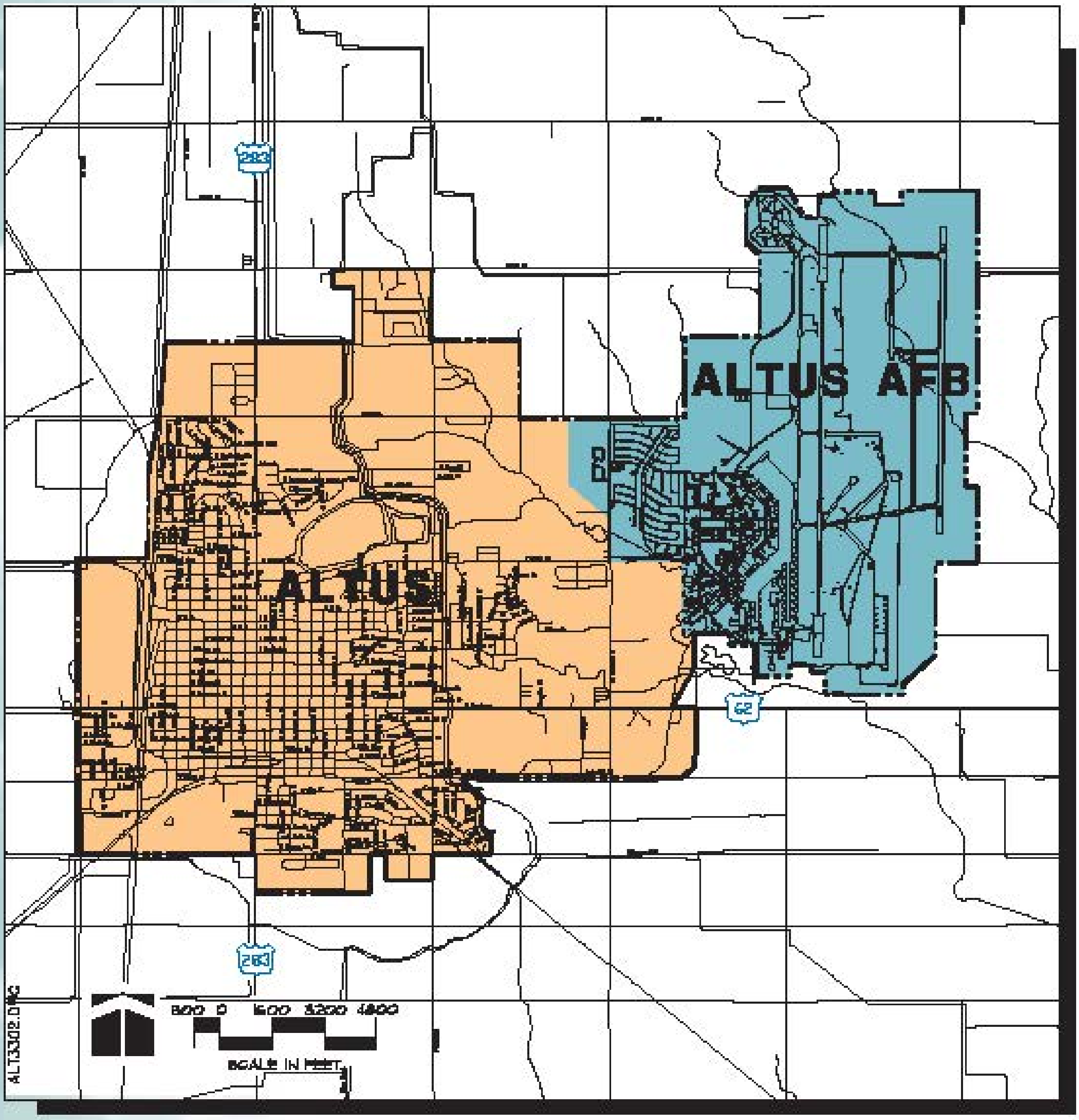
Narrative

Figure 3.1
Regional Map



Narrative

Figure 3.2
Vicinity Map



3.5 INSTALLATION AND LOCAL HISTORY

The evolution to what is now known as Altus AFB began during World War II when the base was established by the War Department on 17 June 1942. Designated as Altus Army Air Field, it served as an advanced flying school during World War II until it was inactivated by the Army in 1945. During that time almost 5,400 graduated pilots learned advanced techniques while flying AT-9s, AT-17s, and UC-78s.

In September 1948, the War Assets Administration Office in Dallas, Texas, deeded the installation over to the City of Altus for $1, and it became the "Altus Municipal Airport." Since the City of Altus could only utilize a small number of the facilities on the installation, most of the structures fell into a state of disrepair and many of the smaller buildings were sold to the public.

When the Korean War conflict began, Tactical Air Command (TAC) was looking to expand its forces. Partially due to the strong involvement of some prominent community leaders, Altus AFB was reactivated in January 1953 with the 63d Troop Carrier Wing, Heavy, as host. Their commitment only lasted for a short time before Strategic Air Command (SAC) activated the 96th Bombardment Wing, Medium, at Altus AFB in November 1953, where it assumed full control on 21 June 1954. SAC flew B-47s and KC-97s until 1958 when they were replaced by B-52s and KC-135s. Also during this time period, SAC had 12 Atlas F missile sites in the area, which were inactivated in 1965.

KC-97s at Altus, 1953

Loading Army Cargo, 1968

Control of Altus AFB was passed over to the Military Airlift Command (MAC) on 1 July 1968. The KC-135s continued their air refueling mission at the base through tenant units. In May 1969, MAC transferred the 443^{d} Military Airlift Wing, Training, from Tinker AFB in Oklahoma City to Altus AFB. Its mission was to train C-141 and C-5 aircrews. This new mission created a large construction program to accommodate the technical training unit.

In the early 1990s, the Air Force replaced the MAC, TAC, and SAC commands with the newly created Air Mobility Command (AMC) and the Air Combat Command (ACC). It also replaced the Air Training Command and Air University with the Air Education and Training Command (AETC). These changes altered the command at Altus AFB. Both the 443^{d} Military Airlift Wing, a MAC unit, and the 340th Air Refueling Wing, a SAC tenant unit, began reporting to AMC. Shortly after the change, AMC inactivated both units and replaced them with the newly created 97th Air Mobility Wing (AMW). Less than a year later, command of the 97th AMW was transferred to AETC, and the 97th AMW transferred ownership of its KC-135s to an AMC unit at Robins AFB, Georgia. During this same period, the 97th AMW received the KC-135 Combat Training School from Castle AFB, California, and the move to Altus AFB was completed in March 1995.

Meanwhile, in June of 1994, it was announced that Altus AFB would be home to the new C-17 and its training facilities. The first C-17, the "City of Altus," arrived on 23 March 1996, and Altus AFB has since graduated many C-17 aircrews.

Throughout the base's varied past and its changes in command, it has been able to maintain the original mission of providing the best formal training possible to its students.

97th AMW, America's First Air Mobility Wing, 1992

South End of Taxiway, Looking West

3.6 PHYSICAL ASSETS

Altus AFB encompasses 6,593 acres of land: 4,698 acres is government-owned property and 1,895 acres is either leased or in easements or right-of-ways.

Altus AFB has two runways and one assault strip:

Inside Runway (17R/35L)
13,440 ft. by 300 ft.

Outside Runway (17L/35R)
9,000 ft. by 150 ft.

Assault Strip
3,500 ft. by 90 ft.

Sooner Drop Zone, a 640-acre site, is used for aerial cargo drop training.

Authorized aircraft for this installation are:

C-5	8
C-17	10
KC-135R	24

The actual number of aircraft varies depending upon world conditions and training needs.

Altus AFB contains approximately 1,273 buildings totaling over 4.1 million square feet. Included in this are 966 family housing units: 700 units in Capehart Family Housing, 82 units in Bicentennial Family Housing, and 184 units in Great Plains Housing areas.

Sooner Drop Zone

Cotton Fields Located West of Base

3.7 SOCIOECONOMIC CONDITIONS

Altus is a city of unique charm and graced with large mature trees, cultural attractions, and recreational facilities. The Annual Oklahoma Summer Arts Institute at Quartz Mountain State Park draws students, artists, and performers from across the state. County fairs, rodeos, and roundups are all part of the Altus community lifestyle.

The City of Altus has a population of 22,000 and this makes up about 80 percent of Jackson County's population.

Altus AFB supports approximately 2,200 permanent party military personnel and has an average of 430 students in training per month. About 2,654 military personnel dependants live on and off base. The surrounding community has close to 1,174 military retirees who depend on base facilities.

The base provides direct employment for approximately 2,500 civilian personnel. Altus AFB supports the employment of over 6,300 area people. Based on payroll, construction, and operational expenditures, Altus AFB has an estimated annual economic impact on the local community of over $200.8 million. Agriculture also plays a significant role in the area's economy. Major products are cotton, wheat, cattle, horses, ostriches, and greyhound racing dogs.

3.8 LOCAL GOVERNMENT

The City of Altus has a mayor/council form of government. The city's first Planning Commission was appointed in 1958. A comprehensive plan, zoning ordinance, and development code continue to direct new growth within the city, as Altus' Economic Development Committee works to promote community development. The Jackson County Zoning Board and the City of Altus join together to form the Metropolitan Area Planning Council which regulates land use, structure heights, and residential density three miles outside of the city boundaries.

Jackson County Courthouse

3.9 COMMUNITY INVOLVEMENT

The unique camaraderie between Altus AFB and the City of Altus fosters strong base/community relations with a high degree of community involvement. The base has a positive impact on the community through its churches, private organizations, charities, schools, and civic activities. Working together for the common good, the Air Force core values of integrity, service, and excellence are shared and practiced throughout the community. The involvement and support of the local community and its civic leaders were instrumental in getting the base established and assuring its reopening during the Korean War era. This support continues as both the city and the installation search for solutions to meet ever changing needs and requirements.

Barbeque

For over 50 years, Altus AFB personnel and their families have partnered with the citizens of Altus to form one of the greatest base/community relationships in the entire Air Force. Altus AFB greatly appreciates the people of Altus and often finds ways to give back to the community. Taking part in the "Spirit of Oklahoma," Air Force members performed over 116,903 hours of volunteer service in the community in fiscal year 2001.

Rodeo Event for Children

Ride-em Cowboy, Rodeo Event

Section 4.0

General Plan – Component Plan Overview

4.1 GENERAL PLAN COMPONENTS

This is the core section of the General Plan. The narrative discussion and graphic illustrations within this section provide the information upon which base development occurs in the future. The four component plans, along with their supporting detailed element plans, are summarized, and pertinent information is illustrated in maps.

4.1.1 Composite Constraints and Opportunities Component

This component plan provides information about the natural and built environment that can limit or expand the mission and support capability of installation property. Integrating this information identifies areas that have either limited or specialized development potential.

4.1.2 Infrastructure Component

The Infrastructure Component provides an overview of utility, communications, airfield, and road systems. It is important to understand each engineering system's capacity to meet mission requirements and development needs.

Flyover During Parade Ceremony

Aerial View to the Northeast, Flightline, Industrial Area

4.1.3 Land Use and Transportation Component

The Land Use and Transportation Component identifies and analyzes the functional relationship of installation activities that occur on the installation and their importance in terms of proximity to one another. The future land use and transportation plans provide guidance for development, and the design guidelines provide aesthetic direction.

4.1.4 Capital Improvements Program Component

This component describes and locates projects identified for funding. The installation has a vigorous capital improvement program to meet the physical requirements necessary to support current and projected missions and provide quality of life to its personnel.

4.1.5 Relationship of Component Plans

Each component is a summary of the various studies, reports, documents, and research previously accomplished. The structure of the component plans provides an appropriate scope of detailed, accurate information.

For example, the General Plan contains only schematic representations of utility systems. Mapping and other data maintained by the Base Civil Engineer contain line diameters, materials, and other information important to the development and maintenance of the utility systems.

Base personnel are responsible to update the General Plan as changes occur in the component plans.

4.2 COMPOSITE CONSTRAINTS AND OPPORTUNITIES

The Constraints and Opportunities Component addresses information on the natural and man-made environments that affect the installation. It also addresses environmental factors that must be considered within the planning process to ensure compliance with the National Environmental Policy Act (NEPA).

Constraints are more easily seen and understood than opportunities. Constraints could include floodplains that inhibit development and noise pollution that limits recreational use or restricts social interactions in areas affected by high noise levels. Conversely, opportunities presented to the base are not only for future development and expansion of facilities, but include opportunities to enhance visual setting and quality of life. For example, undeveloped areas provide natural habitat for passive and active outdoor recreation.

The following paragraphs identify those features that may constrain or provide opportunities for base development and or add to its quality of life. Figure 4.1 provides information on environmental constraints and opportunities. Figure 4.2 illustrates operational constraints and opportunities that result from airfield operations, clearances, and safety distances. These two figures are compiled from figures that follow later in this section and identify the specific environmental and operational activity.

4.2.1 Natural, Cultural, and Man-Made Resources

The following natural, cultural, and man-made resource elements of the area can impact future development by the following physical and environmental constraints and opportunities.

4.2.1.1 Climate This region experiences a typical continental climate with hot summers and cool, dry winters. The coldest month is January with an average temperature of 39.3 degrees Fahrenheit. Spring can bring a variety of weather from tornados to damaging hail and thunderstorms and high winds. The warmest months are July and August with average daily temperatures greater than 80 degrees Fahrenheit; it is not uncommon for many days to exceed 100 degrees. The average amount of precipitation is about 25 inches per year with most of it occurring in May, June, and September. The seasonal change is gradual with an average growing season of about 224 days. This region of Oklahoma experiences about 300 clear days per year making it very compatible with the flying operations at Altus AFB.

4.2.1.2 Geology and Physiography

Located within the geological province known as the Hollis Basin, this area was once a large seabed of shallow marine, deltaic, and alluvial deposits. The underlying sediment deposits include sandstone, shale, and siltstone, interlaced with beds of gypsum and salt. Altus AFB lies within the Central Redbed Plains area of the Central Lowlands

physiographic region, so named because of the high iron content of its deposits.

Generally, the underlying geology is relatively stable and presents no significant difficulties to development at the base.

4.2.1.3 Topography As illustrated in Figure 4.3, the lay of the land is generally level, but gently sloping from the north to the south. Elevations range from a high point of 1,390 feet on the north edge of the base to a low point of 1,330 feet on the south edge, approximately three miles in distance. The immediate landscape lacks any distinct features with the only relief created by stream erosion. Off to the northeast, creating a pleasant backdrop to the base, is the Wichita Mountain Range.

4.2.1.4 Hydrology There are no significant aquifers in this region, and what ground water is available has a high suspended solids and gypsum content making it a non-potable water source. The majority of the available water in this area is from impounded surface water bodies. Surface hydrology in the area consists of the North Fork of the Red River, located about 13 miles north of the base, and the Salt Fork of the Red River, which is located approximately five miles west of the base. Surface water is drained from the base by two streams, Stinking Creek and an unnamed tributary to Stinking Creek, flowing from the northwest to the southeast. A few small ponds and an irrigation channel are also present on base, but are not available as potable water sources. The City of Altus and subsequently Altus AFB receives its water from the Tom Steed Reservoir located 15 miles northeast.

An agricultural irrigation channel, the Ozark Channel, enters the base

Sunrise Over Wichita Mountain Range

property at the northern end, near the old alert area, crosses under the northern edge of the inside runway, continues to run the length of the eastern boundary, and exits the base at the southern edge. This canal receives no surface runoff from the base, and the base has no access to its waters. The canal is used for agricultural irrigation and is normally dry during the off season.

4.2.1.5 Soils Soil properties are important to the planning process as they can determine the vegetative, environmental, and physical construction potentials at a proposed site. Figure 4.4 graphically illustrates the different soil types occurring at Altus AFB.

The soils present in the main part of the base and in the family housing areas are predominately of the Tillman-Hollister soil association. This association is characterized by broad, nearly level, upland areas occasionally interrupted with narrow creek channels or drainage ways. The soil texture ranges from clay loam to clay. These soils have a slow permeability rate that can cause slow water infiltration and moderately high surface runoff potential.

The area containing the outside runway and assault strip is located predominately within the Miles-Nobscot soil association. Its topography is mostly level uplands to moderately sloping creek channels. This soil type is defined as having a texture ranging from sandy loam to clay loam to clay. These soils have the potential to have a moderate to moderately rapid percolation rate that can lead to a moderate infiltration rate, considerably slowing the surface runoff rate. This type of soil can experience erosion problems.

4.2.1.6 Floodplain Portions of Altus AFB are located within the 100-year and 500-year floodplain. The 100-year floodplain is illustrated in Figure 4.5.

The soils in this region have a low capacity for absorption, which contributes to the flooding problem. The city recently completed a major flood control project north of the base which has reduced the 100-year floodplain. A joint effort between the city, county, and base is being undertaken to address the flood control problems in this area. This effort has already resulted in the construction of detention basins on county property and within the Great Plains Housing area.

4.2.1.7 Wetlands The 1994 wetlands inventory indicated several small seasonal wetland habitats within the boundaries of Altus AFB. As seen in Figure 4.5, about two acres of base property contains the proper amount of water, vegetative species, and soil types to be classified as wetland habitat. The majority of these wetland areas consist of manmade excavations or impoundments, i.e. ponds, sewage lagoons, or drainage channels. While the preservation of wetland areas should be maintained, the amount of existing wetlands should have minimal impact to future development on base property.

4.2.1.8 Vegetation Originally, this was a region of mixed prairie grass, with grass species of bluestem, buffalo, grama, and needle grasses being dominant. Much of the undeveloped areas in this region continue to be mixed prairie grass. Attempts to establish trees on base has been difficult due to the extreme temperatures, lack of moisture, and clay soils with high salt content. Hundreds of trees have been planted on base since its development; however, there are very few native species of trees in this area.

Prairie Vegetation

Altus AFB presently has a land management and grounds maintenance plan for improved and semi-improved lands, a crop management plan, and a bird aircraft strike hazard (BASH) plan. The major grass species used in the developed parts of the base is common Bermuda grass. Side oats grama, blue grama, switch grass, buffalo grass, and little bluestem are some of the species used for the semi-improved areas.

4.2.1.9 Threatened and Endangered Species There are no known threatened or endangered species on the base.

Walkway South of Parade Ground

<u>4.2.1.10 Historic Preservation and Archaeological Resources</u> The National Park Service conducted a cultural resource assessment for Altus AFB in 1995, which indicated that there were no historical or archaeological sites of any significance and that none of the base structures were eligible for the National Register of Historic Places. The survey suggested that the lack of cultural resources was due to two factors. First, the water available to settlers of this region was of poor quality and prevented an abundance of development. Second, the nature of the base's history and land use has significantly disturbed the land's surface. Therefore, the location and preservation of any resources is highly unlikely.

<u>4.2.1.11 Outdoor Recreation Areas</u> There are a variety of outdoor recreational opportunities available including: parks and children's playgrounds; picnic areas; Famcamp; two swimming pools; an 18-hole golf course; and athletic fields. Altus AFB continues to improve outdoor recreation opportunities through its Outdoor Recreation Plan, which guides the development, management, and maintenance of outdoor recreation resources. Refer to Figure 4.6.

Windy Trails Golf Course

Officers Club Swimming Pool

4.2.1.12 Pest Management The success of the base's Pest Management Plan is established through a program of inspections and integrated pest management techniques. The program includes inspection and control of household pests, structural pests, stored products pests, public health pests, ornamental and turf pests, vegetation control, aquatic pests, and Quality Assurance Evaluator monitoring of pest control contracts. Currently there are no significant pest control problems other than typical weed control, birds in the hangars, and ants and mice occasionally found in facilities. Installation personnel have received specialized training and equipment for the control of the Africanized Honey Bee although this is presently not a problem. The Pest Management Plan ensures that all materials are handled, stored, used, and disposed of in accordance with all local, state, and federal regulations where applicable.

4.2.1.13 Land Management A Land Management and Grounds Maintenance Plan has been developed to help conserve, develop, manage, and maintain all lands within base jurisdiction. Planting practices are employed to ensure the protection of soil resources from erosion. The use of grasses, groundcovers, trees, and shrubs not only protects the soil, but also provides an aesthetically pleasing environment in which to live and work.

4.2.1.14 Bird Aircraft Strike Hazard (BASH) Plan The airfields and their environs provide favorable habitat for feeding, loafing, breeding, and roosting of both indigenous and over-wintering bird populations, thus creating the potential for bird-aircraft strikes. Compounding this problem is the fact that Altus AFB is also located along the Mid-Continental Flyway for migratory birds. Some of the species creating a hazard in this area include: Cattle egrets, hawks, kites, quails, and cranes. In addition to the bird species, animals such as coyotes, rabbits, and hares can be direct strike hazards as well.

The adopted BASH Plan establishes implementation procedures and actions that can be taken to minimize the potential of aircraft bird strikes. Such measures include eliminating broad-leafed weeds, maintaining grass heights to between 7 and 14 inches, removing perching sites and brushy or forested areas, avoiding standing water, planting non-seeding grasses or mowing before seed heads develop, and scheduling aircraft flying hours to avoid peak bird flying times. Civil Engineering is a primary member of the Bird Hazard Working Group and is responsible for the bird control measures mentioned above.

Hazardous Material Storage

Environmental Sampling

4.2.2 Environmental Quality

The impact of an area's environmental factors must be considered when planning for future development. The following are important factors that impact Altus AFB and must be considered in the decision-making process.

4.2.2.1 Hazardous Waste Generation Points Day-to-day base operations generate several types of hazardous wastes that require special handling for proper disposal. These include oils and fuels, cleaning compounds, paints and solvents, batteries, mercury, and lead foil.

Hazardous wastes are collected at an Initial Accumulation Point (IAP) in 55-gallon drums. The locations of the IAPs are illustrated in Figure 4.7. Each IAP site is allowed to keep one drum for waste disposal; once the drum is filled, the IAP is required to contact the Civil Engineer Environmental Flight (CEV) within 72 hours. CEV exchanges the full drum for an empty one and delivers the hazardous waste to a 90-day accumulation site. Buildings 283 and 502 are permitted 90-day accumulation sites, which allow hazardous waste storage for up to 90 days until it is transferred to the Defense Reutilization and Marketing Office.

Hazardous materials are checked for their reusability within the Hazardous Material Pharmacy, Building 228, prior to disposal. This facility also provides for the distribution of small quantities of materials to industrial uses throughout the base, and allows base housing personnel to bring their hazardous materials to the pharmacy for reissue.

An Environment Compliance and Management Program report on the hazardous waste storage and handling program at Altus AFB stated it was outstanding and one of the best in the Air Force.

Recycling Collection Bins

4.2.2.2 Solid Waste Disposal and Recycling All refuse generated on base, including base housing and the industrial areas, is collected weekly by a local contractor and disposed of in the city's landfill.

Altus AFB has a very active recycling program with mandatory weekly curbside pick up for the entire housing area. All recyclable materials are collected and processed at the designated recycling center, Building 400. Many of the military personnel, retirees, and dependents living off base participate in the recycling program. The base has been working with both the City of Altus and Jackson County to help them establish a successful recycling program for the region.

4.2.2.3 Fuel Storage An aggressive program in the past few years has resulted in the removal of most underground storage tanks (USTs). Only two active USTs remain at the hospital and these are tested annually. Three USTs are located at the AAFES gas station, and these are within underground vaults. USTs and aboveground storage tanks (ASTs) are shown in Figure 4.8. The base has also implemented a program to remove all abandoned fuel systems, and only one abandoned hydrant system remains in place.

Fuel Storage

4.2.2.4 Installation Restoration Program Sites In an effort to protect the environment and subsequently human health, the USAF developed the Installation Restoration Program (IRP) to identify, investigate, clean up, and ultimately close out sites with histories of hazardous waste spills or disposal. Altus AFB has identified a total of 26 IRP sites which have been studied to determine the extent of contamination.

A report was submitted to EPA November 2002 with recommended corrective actions for these sites. The EPA will select the correct action and corrective measures will be implemented.

Some sites must complete a long-term ground water monitoring program to be considered for closure. Monitoring wells are located around the sites where contamination possibly occurred. Figure 4.8 identifies the location of these sites, and Table 4.1 gives the site number and a brief description of each.

Table 4.1
INSTALLATION RESTORATION PROGRAM SITES

Site No.	Description
SWMU01	Former Fire Protection Training Area No. 1
SWMU02	Former Fire Protection Training Area No. 2
SWMU03	Former Fire Protection Training Area No. 3
SWMU04	Former Fire Protection Training Area No. 4
SWMU05	Landfill No. 1
SWMU06	Landfill No. 2
SWMU07	Landfill No. 3
SWMU08	Landfill No. 4
SWMU09	Abandoned Aircraft Washrack Pond
SWMU10	Former AGE Washrack Pond
SWMU11	Former Wastewater Treatment Plant
SWMU12	Red Fuming Nitric Acid Neutralization and Burial Site
SWMU13	Low-Level Radioactive Material Disposal Site
SWMU14	UST and Drum Storage Area
SWMU15	POL Tank Sludge Burial Area
SWMU16	Bulk Fuel Storage Tank Area
SWMU17	Explosive Ordinance Demolition Area
SWMU18	Oil Water Separator 33 at Various Locations
SWMU19	Former Holding Tank at Building 291
SWMU21	Former Base Exchange Service Station
SWMU26	Auto Hobby Shop
SS-17	Spill Site East of Building 506
SS-18	Spill Site East of Building 394
SS-22	Building 323
SS-23	Spill Site Between Taxiway A and Runway
SS-24	Spill Site in Southeastern Portion of Base

4.2.2.5 Air Emissions Sources Air emission quality is monitored by the State of Oklahoma. Altus AFB has a current minor air permit and is in compliance with state air emission quality standards. Figure 4.9 shows the location of these emissions.

4.2.2.6 Wastewater and Stormwater Discharge The majority of Altus AFB wastewater is discharged to the city's public owned treatment works plant. A few facilities on base are still using on-site wastewater treatment systems such as septic tank and absorption field or waste stabilization pond.

Base stormwater runoff drains predominately to the south and east. Stormwater is collected into a system of open ditches and carried to one of five outfalls from the base. As part of an implemented stormwater pollution prevention plan, measures such as mini-booms (absorbent pads), allow any pollutants entering the drainage system to be recovered.

Stormwater sampling and discharge points are shown in Figure 4.9, along with the wastewater discharge point.

4.2.2.7 Drinking Water Supply All potable water is purchased from the City of Altus. The city's water treatment plant receives its water from a surface impoundment storage source, the Tom Steed Reservoir, which is approximately 15 miles to the northeast. The water is considered to be on the hard side, but quality is good. Potable water is stored in two elevated storage tanks to help maintain maximum pressure for the water distribution system.

Altus AFB is currently in compliance with all drinking water standards.

4.2.2.8 Electromagnetic Radiation Sources There are electromagnetic radiation sources on base, however, they should not impact any future uses. There is also a low level radioactive burial site located in the quantity distance zone at the southeast end of the inside runway. This site contains instrument dials from old WWII aircraft that are encased in concrete and buried. The site is fenced in and posted, and is tested annually for leakage.

4.2.2.9 Radon Emissions A 1999 survey of radon emissions at Altus AFB indicated no levels over the allowable minimum standards were present.

4.2.2.10 Asbestos and Lead Paint A survey sampled suspected areas, typically buildings constructed prior to 1980 and child impacted sites. Most occurrences of asbestos or lead paint were found within the mechanical rooms located throughout the base, and some suspect sites were in the housing area.

A database of sample findings has been developed as a management tracking tool for providing information to contractors and engineers. This information is needed to be considered during the design phase of new projects, particularly renovation projects.

4.2.2.11 Polychlorinated Biphenyl (PCB) All PCBs have been removed. Altus AFB is virtually PCB free.

4.2.3 Air Installation Compatible Use Zone (AICUZ) Program

The AICUZ program promotes compatible development around air bases. An AICUZ study used by local governing bodies provides them with recommendations for land use restrictions. AICUZ studies describe three types of constraints that affect, or result from, flight operations.

The first constraint involves height restrictions identified by Federal Aviation Regulations Part 77. Public agencies involved with approvals of permits for construction should require developers to submit calculations proving that projects meet the regulatory criteria.

The second constraint involves noise zones produced by computer simulation of average flight activity.

Control Tower

The base's simulated Day-Night Average Sound Levels (DNL) in decibels (dB) appears as contours in Figure 4.10. Table 4.2 lists land uses that are considered compatible for the various DNL noise contours.

The third constraint involves accident potential zones based on statistical analysis of past Department of Defense (DoD) aircraft accidents. The clear zone, the area closest to the runway end, is the most hazardous. Generally the DoD acquires clear zone land through

Table 4.2
LAND USE COMPATIBILITY CHART – NOISE ZONES (DNL dB)

Generalized Land Use	65-70	70-75	75-80	80+
Residential	No[1]	No[1]	No	No
Commercial	Yes	Yes	Yes	Yes
Industrial	Yes	Yes	Yes	No
Public and Quasi-Public Service	Yes	No[1]	No[1]	No
Recreation	Yes	Yes	No	No
Public Assembly	No	No	No	No
Open, Agriculture, Low Density	Yes	Yes	Yes	No

1 Unless sound attenuation materials are installed.
Note: See 1999 AICUZ Study for for specific land use guidelines.

Table 4.3
LAND USE COMPATIBILITY CHART – ACCIDENT POTENTIAL ZONES

Generalized Land Use	Clear Zone	APZ I	APZ II
Residential	No	No	Yes[1]
Commercial	No	No[2]	Yes[2]
Industrial	No	Yes[2]	Yes[2]
Public and Quasi-Public Service	No	No	No
Recreation	No	Yes[2]	Yes[2]
Open, Agriculture, Low Density	No[3]	Yes[2]	Yes[2]

1 Maximum density one dwelling unit per acre.
2 Limited low-density uses only.
3 Except limited agricultural uses are permitted.
Note: See 1999 AICUZ Study for specific land use guidelines.

purchase or easement to prevent development. Accident potential zones (APZ) extend beyond the clear zone from the runway end. In these accident potential zones, land use planning and controls are strongly encouraged for the protection of the public. Table 4.3 lists land uses that are considered compatible for the various accident potential zones.

The AICUZ study prepared in 1999 used baseline conditions including a mixture of aircraft types and operations. Currently assigned aircraft are the C-5, C-17 and KC-135. Transient aircraft represent less than two percent of overall daily operations. An operation is defined as one take off and one landing. The AICUZ study used an average of 20 flying days per month and 464 daily planned aircraft operations. On-base development should be planned to meet the air operations compatibility land use guidance. Airfield operations standards provide criteria for developing, designing, and siting airfield facilities. Airfield operational wavers are processed for deviations when these standards cannot be met. The airfield clear zones, accident potential zones and primary surfaces are imaginary surfaces used to ensure sustained, safe, economical, and efficient aircraft operations. The Altus AFB goal is to create a safe, efficient and unobstructed airfield by removing present airfield obstructions that violates airfield operations standards.

Nine facilities are located within the clear zone. These facilities are programmed for demolition as part of the Airfield Obstruction Reduction Initiative (AORI). Replacement facilities are programmed and await funding. Currently, aircraft parked in 15 spots (1-8 and 41-47) on the south ramp are in violation of airfield criteria.

The land surrounding the base is primarily undeveloped agricultural lands and associated rural residences. A Joint Land Use Study

(JLUS) prepared in 1999 reported the surrounding area would most likely remain undeveloped agricultural land with some continued residential development to the north. There are no known future subdivision or transportation plans that would encourage incompatible development.

In early 2003, Altus AFB completed the purchase of almost 1,100 acres of easements within the clear zones and accident potential zones. These easements will help to promote public health, safety, and general welfare through compatible land use in non-government owned areas surrounding the airfield.

The Jackson County Zoning Board and the City of Altus joined together to form the Metropolitan Area Planning Council (MARC). This council regulates land use, structure height, and residential density within three miles of the Altus City limits. Recent legislation has been passed to allow the city of Altus zoning authority five miles beyond their city limits.

The Altus Municipal Airport is located six miles northwest of Altus AFB. Flying operations of these facilities do not impact each other.

4.2.4 Safety Criteria

There are three areas on Altus AFB that require Quantity-Distance (QD) explosive safety zones. These areas are around the igloo storage area in the south end of the base and a calibration hard stand area and alternate cargo pad located east of the inside runway. The igloos were

Taxiways H and J, Looking Southwest

originally constructed to support the Strategic Air Command mission. These facilities are used to store small munitions and require a designated clear zone around them. A designated suspect vehicle site is located within the main QD safety zone at the southern end of the inside runway. Manned facilities are not to be sited within these QD safety zones due to life safety reasons. There are also several facilities throughout the base licensed to store less than 100 pounds of explosives.

The primary movement route is used to bring commercial or military vehicles carrying explosives to the munitions storage area. A secondary explosive hauling route provides a safe means of ingress and egress to the base in the event that the primary route is impassable. The secondary road is carefully routed to avoid interfering with flight operation or traversing the more heavily populated parts of the base.

Figure 4.11 delineates the QD safety zones, facilities that store explosives, and the munitions convoy routes.

4.3 INFRASTRUCTURE

The information contained in this section provides a brief description of each infrastructure component and comments on its existing general condition.

Air Education and Training Command (AETC) has a green-yellow-red system for rating the overall condition of infrastructure and base facility groups for its installations. As part of Altus AFB's goal of aggressively pursuing infrastructure upgrades and replacement of aging systems to ensure it keeps pace with facility improvements, the base has incorporated this AETC rating system into its infrastructure program.

- 🔴 Red signifies that the system is in poor condition and requires significant attention to bring it up to standards.
- 🟡 Yellow indicates that the system is in fair condition and will require moderate construction to ensure its future use.
- 🟢 Green means the system is in good condition and only requires routine maintenance and repair.

Table 4.4 gives a brief overview of the condition of the existing infrastructure at Altus AFB as rated by the Facility Infrastructure Examination(FIX) Program, May 2001.

Table 4.4
2001 FIX RATINGS

Infrastructure System	Base Rating
Water Supply	🟡
Fire Protection	🔴
Sanitary Sewer	🔴
Storm Drainage	🟡
Natural Gas	🟡
Liquid Fuels	🟡
Electrical	🟡
Airfield Lighting	🟡
Backup Power	🟢
HVAC	🔴
Communications	🟡
Base Pavements	🟢
Airfield Pavements	🟡

4.3.1 Water Supply

The City of Altus supplies the base with water from its water filtration plant located approximately three miles to the west. Water supplied by Altus comes from a surface im-poundment storage source, the Tom

Base Water Tower

Steed reservoir. Water quality from this source is considered good with a hardness factor of 220 parts per million. A 16-inch main and a 10-inch main deliver the water to the base, entering near the front gate. The main base and housing areas are metered separately to monitor usage.

The water distribution system is a looped system as illustrated in Figure 4.12. About 85 percent of the system main pipes are polyvinyl chloride pipe (PVC). The remaining mains are Transite lines, pipe constructed of Portland cement and asbestos fibers, and cast iron lines, pipe that deteriorates rapidly in the highly corrosive soils of this region. Future projects will replace these remaining mains with PVC.

Potable water is stored in two elevated storage tanks on base, with a total capacity of 750,000 gallons. These tanks help to maintain a maximum system pressure of 55 to 58 PSI.

The condition of the water distribution system was rated fair by the FIX Program. The storage tanks are in fair condition and the distribution lines, including the mains and service lines, are in good condition with the exception of the check valves, which are in fair condition.

The majority of the base irrigation systems are maintained by a civilian contractor. Potable water is used for irrigation.

4.3.2 Fire Protection

Water for base-wide fire fighting capabilities is stored in five tanks: three aboveground deluge tanks and two elevated water storage tanks. Altus AFB received a poor FIX Program rating because several fire suppression systems required attention and water storage facilities were not on-line. The water towers have recently been brought on-line. The base fire hydrants are in good shape, however, the presence of four different hydrant types increases maintenance costs and the hydrant tops are not color coded. A flow analysis is needed to determine if a larger, more efficient system is required to adequately accommodate future expansion and provide better service.

4.3.3 Sanitary Sewer

The sanitary sewer system is in poor condition. Most of the original system, constructed over 45 years ago, is concrete or vitrified clay pipe. Due to the corrosive soil conditions and age of the system, much of the piping has disintegrated, leaving behind open underground voids. About 3,000 linear feet of the system was upgraded to PVC. The system contains three lift stations, two of which were renovated 10 years ago and the third renovated in 2000.

Video recordings made in 2002 verified condition of the system mains, and this confirmed the poor condition of the system and validated the need for extensive repair to the utility. On a positive note, the study also confirmed that there are no cross connections in the system.

Drawage Way Through Capehart Family Housing Area

The Altus AFB's treatment plant was abandoned in 1978 when the base went on line with the city's Southeast Treatment Plant.

There are a number of facilities east of the flightline that are still being serviced by individual on-site waste-water systems. Many of these systems are over 45 years old and in need of extensive repair, particularly the distribution boxes and lateral lines. The fire station uses a holding tank system because it is located in a wetland area where conventional absorption systems are prohibited. Holding tank systems require regular pumping, thus increasing mainten-ance costs. There are also a couple of facilities using waste stabilization ponds, which are in fair condition and need to be upgraded to meet current standards.

Overall the sanitary sewer system is in poor condition and should be put on high priority for repair and or replacement. The sanitary sewer system is illustrated in Figure 4.13.

4.3.4 Storm Drainage

The stormwater drainage system at Altus AFB is made up of a network of drainage pipes feeding into open earthen ditches. The drainage flows to the south and east and exits the base from five outfall locations as shown in Figure 4.14. Existing flood control systems on base include the floodway ditch running through the Capehart Family Housing area that empties into Stinking Creek and the detention basin south of Great Plains Family Housing area. For the most part, the stormwater system works well with the exception of flood prone areas in the northeast and southwest corners of the base.

The floodplain area located on the northeast portion of the base extends from the north end of the inside runway and impacts the assault strip and the outside runway.

The base also experiences flooding during significant rains in the southwest, particularly at the front gate and in the family camping and recreation areas. The problem occurs where Stinking Creek exits the base property and the creek channel narrows significantly. This bottleneck, coupled with the work of beavers, causes water to back up onto base property and flood these low lying areas.

Fuel Storage Tanks

4.3.5 Natural Gas

Natural gas is supplied to the base by a private contractor through an 8-inch buried coated steel supply line. The cantonment area and the housing areas are separately metered and on separate looped piping systems, but connected by valves to be used when required. System pressure is maintained at about 30 PSI in winter and in summer.

The majority of the cantonment area main lines are polyethylene plastic and in excellent condition. The polyethylene plastic mains located in Capehart and Great Plains Family Housing areas are in excellent condition. The Bicentennial Housing area mains are polyethylene plastic and in good condition. Facilities located to the southeast of the outside runway and the old alert area are served by natural gas, but are not part of the looped service system. Figure 4.15 illustrates the system.

An annual gas main survey verified that the gas mains on base are in good condition. However, the individual facility coated steel service lines are in poor condition, but are being upgraded as part of an ongoing program.

4.3.6 Liquid Fuels

The fuel management team is responsible for all fuels on base with the exception of the AAFES service station. Altus AFB has a demand of approximately five million gallons of fuel per month. Fuels are delivered by tanker truck, approximately 30 trucks per day.

Figure 4.16 shows the location of the fuel distribution lines and system structures for the pipe line system. Fuel from the bulk storage tanks is pumped to fueling terminals on the north and south ramps. All lines are cathodically protected. The 2001 FIX Program rated the liquid fuels system in fair condition.

4.3.7 Electrical

Electrical service is supplied by one 69 kVA transmission line to an electrical substation located on base, as illustrated in Figure 4.17. A switching station with six circuits feeds electrical service to the various parts of the base. The system is set up with loop feed transformers and switches to interconnect circuits for temporary backfeed capabilities. Circuits D, E, and F have been completely upgraded or replaced within the last years and future plans include a new substation with an express feeder and switch between the new and old substation. This new substation will tie into a second power grid providing two sources of electricity.

Approximately 70 percent of the base system consists of overhead lines, with the remaining 30 percent underground. The family housing area, served by circuit D, was converted to a completely underground distribution system. A long range program will eventually replace all overhead lines with an underground distribution system. The conversion to a completely underground electrical distribution system is expected to lessen system vulnerability due to wind and lightning damage, and increase base beautification by eliminating overhead utility lines. All new construction projects require the installation of underground service lines connected to pad mounted transformers located next to the facilities. The overall wellness of the electrical distribution system is in fair condition.

4.3.8 Backup Power

Altus has a number of permanent and portable generators that provide standby back up power in times of emergency. Approximately 80 percent of the base generator inventory is less than 10 years old, and there is a proactive replacement program. The backup power system is in good condition.

Substation

4.3.9 Central Heating and Cooling

Altus AFB has no central heating, ventilation, air conditioning, or cooling (HVAC) systems. Each building, with the exception of a few dormitory complexes, has its own heating and cooling equipment. Each of the dormitory complexes has a shared chilled water cooling system. One facility, the base chapel, uses an ice bank system. Newer facilities continue to come on line with heating and cooling on-demand capabilities. The 2001 FIX Program rated the HVAC system in poor condition because many boilers, chillers, and air handling units are reaching the end of their life.

4.3.10 Communications

Altus AFB's main telephone switch is a Lucent Definity G3R System installed during June 2001. The current capacity is 3,910 line extensions; it is expandable and is sufficient to meet requirements well into the future. The billeting switch is a government owned, contractor maintained Omni 3 PBX. It has a 700-line capability with approximately 470 lines utilized. The telephone cable plant, located in Building 215, is in a star configuration. As shown in Figure 4.18, 12 main distribution cables totaling 19,800 pairs exit through the manhole and duct system just east of the building. The copper cables are routed through the manhole and duct system throughout the rest of the base. Some portions of these cables are also direct buried.

In 1997, Combat Information Transport System installed an extensive manhole and duct system throughout the base in support of the copper distribution cables and the installation of the base fiber optic network. Figure 4.19 diagrams the manhole and duct system and the base fiber optic network. This network enhances the communications expandability, survivability, reliability, and maintainability. The network electronically connects the major buildings enabling base-wide computer users to transfer data at maximum speeds through the Base Local Area Network.

4.3.11 Base Pavements

The Altus AFB road network consists of approximately 20 percent rigid pavement and 80 percent flexible pavement. It is considered to be in good to excellent condition and adequately serves base traffic.

4.3.12 Airfield Pavements

The airfield pavement system provides takeoff and landing surfaces and safe operating areas for ground movement, maintenance, and parking of aircraft. The inside runway is approximately 85 percent concrete, whereas the newer outside runway and assault strip are mostly asphalt. Runways are rated on a light, medium, and heavy scale, based on the type of traffic and loads they are designed to handle. Due to the size of the aircraft used at Altus AFB, the airstrips are classified with a heavy rating. Airfield pavements are considered to be in fair condition.

4.4 LAND USE AND TRANSPORTATION

Land use and transportation plans provide direction for the development and improvement of base resources in which people can work and live in an efficient, aesthetic, and safe environment. This is accomplished through good planning principles, which include collocating compatible or similar types of land uses and separating incompatible land uses.

4.4.1 On-Base Existing Land Use

Mission operations and its associated uses significantly impact the use of base-owned property. The proposed land use plan should be carefully considered when determining the use and future growth potential of base facilities and land.

Figure 4.20 shows existing land use at Altus AFB. Table 4.5 defines the typical types of facilities found in each land use category.

Table 4.5
LAND USE DEFINITIONS

Land Use Category	Map Color	Typical Facilities and Features
Airfield	White	Aircraft operating areas.
Airfield Pavements	Brown	Runways, taxiways, aprons.
Aircraft Operations and Maintenance	Dark Blue	Base operations, control tower, fire station, aircraft maintenance hangars, shops, docks.
Technical Training	Light Blue	Classroom buildings.
Industrial	Gray	Base engineering, maintenance shops, storage, warehousing, utilities.
Administrative	Orange	Headquarters, civilian personnel, education center, law center, security operations.
Community-Commercial	Red	Commissary, exchange, clubs, dining hall, recreation center, fitness center, theater.
Community-Service	Pink	Post office, library, chapel, child care center, education center.
Medical	Violet	Clinic, dental, medical storage.
Housing-Accompanied	Yellow	Family housing, temporary living facility.
Housing-Unaccompanied	Ochre	Dormitories, visitor housing.
Outdoor Recreation	Dark Green	Outdoor court and field, swimming pool, golf course, driving range.
Open Space	Light Green	Conservation area, buffer space, undeveloped land.
Note: Associated parking is included in land use category.		

Past development at Altus AFB has incorporated generally good land use principles and policies. The grouping of compatible land uses and the separation of conflicting uses has resulted in an efficient clustering of the industrial areas and maintenance areas, has assisted the development of a training campus, and has separated the base housing area from adverse land uses.

As shown in Figure 4.20, single family housing is clustered on the west perimeter of the installation separated from the cantonment area. The industrial facilities are consolidated at the southern perimeter of the installation, and operations and maintenance areas are located along the flightline. Commercial and service community land uses are centrally located and easily accessible to the entire base. Recreational areas and open space are located predominately along the northwestern side of the base and also at the southern edge of the family housing area next to the front gate. Base residents have easy access to recreational facilities. A program to consolidate training facilities has led to the development of an academic training campus located in the northwest corner of the central core of the base.

Current land use configurations still contain some non-conforming land use areas, such as administration and community service facilities intermingled in the industrial area. Some training facilities are located in outlying areas, and these should be brought into the training campus. Facilities are located within the QD safety zone at the south end of the runways.

4.4.2 On-Base Future Land Use

Figure 4.21 graphically illustrates the Future Land Use Plan for Altus AFB. This plan reflects the anticipated results of the implemented August 2002 Air Force Center for Environmental Excellence (AFCEE) Assistance Team's plan for future development, the *Altus AFB 2030 Plan*. The thrust of the AFCEE Assistance Team was to assist the base in developing their future planning vision, the *Altus AFB 2030 Plan*. This was accomplished through the preparation of four area development plans: Wing Headquarters Campus, Air Mobility Training Campus, Central Base Recreation Campus, and North Ramp Expansion. The *Altus AFB 2030 Plan* vision is discussed and illustrated in Section 2 of this General Plan.

The Altus AFB Facilities Utilization Board (FUB) is a management tool used to orderly and systematically guide future development of the *2030 Plan* and ensure the compatibility of adjacent land uses. The facility programming decisions of the FUB will ultimately determine the success of Altus AFB abilities to accomplish its existing and future mission goals.

4.4.3 On-Base Transportation

The road network is designed to safely move vehicular traffic with a minimum amount of congestion and

Altus Main Gate

delay. This includes ingress and egress traffic movements, as well as traffic on base.

Altus AFB has three access gates. The main gate is located on the west side of the base at the end of Falcon Road and is used by base personnel and visitors. The south gate is a low-use gate located next to the industrial and fuel storage areas. This gate is used by trucks carrying explosives and fuel supply trucks and is accessible from US Highway 62 and Challenger Boulevard. The new north gate serves the family housing area.

The existing road network lacks hierarchy between the primary and secondary streets. There is nothing to give the visual indication that one road is more dominant than another. This combined with the angled streets and irregular intersections can cause confusion in traversing the base.

There are several ways to improve the road network, and these are illustrated in Figure 4.22. Reconfigured intersection improvements are needed to allow for a safer and more efficient traffic flow throughout the base. The F Avenue and Seventh Street intersection could be altered to allow for a more continuous flow of traffic through the area. Proper alignment of the Seventh Street and D Avenue intersection would benefit traffic safety and provide a better sense of direction to users. The intersection at First Street and F Avenue could be enhanced to indicate its significance as the cross point of the base's two major axes roads. First Street could be continued to the north to a possible future golf clubhouse and public access gate. F Avenue should be developed into the primary east west route across the base. Street hierarchy can be accomplished through landscaping, paving and curbing details, widening or lighting, and signage fixtures.

4.4.4 Off-Base Land Use and Transportation

Altus AFB is within the city limits of Altus. The majority of the area surrounding Altus AFB is open, undeveloped land, except for the development associated with the city to the west. This area is primarily composed of residential structures with commercial development occurring along the highways and arterial roads. Some commercial and industrial land use occurs to the southwest of the base and within the city boundaries.

The area to the south is undeveloped agricultural lands and their associated single family farm homes. Also located in this vicinity is a cattle feedlot and a municipal sewage treatment facility. The area east of the base consists of undeveloped agricultural lands with a few scattered rural residential structures. Agricultural lands are also located on the northern side of the base intermingled with single family residential developments. New housing developments appear to be occurring predominately to the northwest of Altus AFB.

Future development of the lands surrounding the base is not likely to change from its current use. Land use should typically remain in undeveloped agricultural use with occasional pockets of single family residential structures. However, expansion of the city tends to be easterly toward the west boundary of the base. The continuation of industrial development is planned for the area south of US Highway 62, in the southeast corner of the city. Future city changes also include the development of several parks and a series of flood control projects providing solutions for areas experiencing flooding problems.

Altus AFB accomplished a JLUS plan in 1999 with the City of Altus and Jackson County. The municipalities have yet to enact the zoning height restriction ordnance. Several options are currently being considered to implement the JLUS recommendations including zoning and height restrictions within three miles of the installation boundaries. It is essential that the cooperative planning effort between the city and the base continue in order to ensure minimal impact upon the surrounding community from potentially conflicting land uses that may be associated with base operations.

Round Up at end of Runway

Dormitory

Distinguished Visitors Quarters

4.4.5 Dormitories

Unaccompanied housing has an inventory of 402 units in permanent party dormitories: Buildings 213, 331, 333, and 335. These dorms have recently undergone extensive renovation to meet Air Force (AF) standards, however they do not meet the AF 1+1 with kitchens standard. Building 315 consists of 76 recently renovated rooms for pipeline students.

Altus AFB has 464 Visiting Quarters (VQ) and Temporary Lodging Facilities (TLF) in inventory, built between 1955 through 1998. The units range from good condition to poor condition. The current inventory does not meet the current requirement. An average 20 to 25 persons per day are lodged in off-base community accommodations.

4.4.6 Family Housing

The family housing community at Altus AFB consists of 966 units built in three separate communities that are located next to each other west of the base cantonment area. Family housing is provided for officers and enlisted personnel of all ranks.

Capehart Family Housing Area

Great Plains and Bicentennial Housing Communities

The largest and oldest family housing community, Capehart, consists of 700 units built in 1959. This community is located between Altus Road and Kellwood Drive. The base golf course, hospital, commissary, and exchange create the eastern boundary. This housing community is bordered by undeveloped land to the north, recreational areas on the south, and Bicentennial housing to the west. Access to the community is from Fir Drive, Dogwood Avenue, and Birch Drive via Altus Road.

Bicentennial housing consists of 82 units built in 1976. The area is bordered by undeveloped land to the north, recreational areas on the south, and Great Plains housing to the west.

The newest housing community, Great Plains, consist of 184 units built in 1998. The community is bordered by undeveloped land to the north and west, open space to the south, and Bicentennial housing to the east. Access to this community is from Begonia Avenue and Tamarack Road.

Family housing is scheduled for the Housing Privatization Initiative in January 2004. Housing improvements are to continue through privatization, thus achieving the required Air Force housing standards and providing base personnel with a quality living environment.

Altus AFB's total requirement for family housing is 917 units, which is 49 units less than the current inventory. The 49 unit surplus is scheduled for demolition.

Wing Headquarters

Flying Training Classroom Facility

Holsey Center

4.4.7 Base Architecture

Altus AFB has established an architectural program that allows the freedom of flexibility and creativity, while ensuring that the built environment reflects a consistency of thought, unity of purpose, and highest design value. This is achieved by having very limited, but stringent architectural design standards. These standards include the use of aged bronze sloped standing seam metal roofing and a variety of exterior wall finishes and colors. Colors depend on the architectural zone and are predominately buff or beige tones. The maintenance and industrial zone is an exception because off-white colors achieve a sense of simplicity, strength, and permanence, while providing a unifying attractiveness, and reducing heat gain during summer months.

Dormitories

Using Landscaping To Make A Positive Impression

4.4.8 Landscaping

The wise use of landscaping helps to create a more attractive base at a relatively low cost. Altus AFB is enhancing its appearance by removing trees and shrubs, which have been severely pruned or damaged. In addition, landscaping material, which screens pleasant views or has become overgrown, is trimmed, replaced, or removed.

The base has a plant material list and observes the following landscaping recommendations:

- Use landscaping to accent buildings, to give form to spaces between buildings, and to create positive images and buffer negative ones.
- Provide linkages between facilities by landscaping between them and around hard surface areas and pedestrian areas.
- Use landscaping at the main and south gates to create a positive and forceful first impression of Altus AFB.
- Integrate ground level exterior lighting with landscaping.
- Require landscaping plans in facility designs to ensure proper plant selection and location.

Trees Block View Of Substation

Making Proper Plant Selection

Parade Grounds In Front Of Wing Headquarters

4.5 CAPITAL IMPROVEMENTS PROGRAM

The Five-Year Capital Improvements Program includes all programmed funded renovation and replacement projects. Because of Altus AFB's aggressive and far reaching *2030 Plan,* only the demolition and minor and major construction projects are included in this General Plan. These projects illustrate the dynamic approach taken by the base to support its current and projected missions. A star (✰) identifies projects in the *2030 Plan*. Projects are listed on the following tables and illustrations by a numbered key code and not by priority.

Capital Improvements Projects

Table 4.6 DEMOLITION PROGRAM

Figure

1 January 2003

Key	Project No.	Project Description	Program
FY03			
1	97-3014A	Base Engineer Pavement and Grounds Facility, Building 30.	O&M
2	02-1015	Golf Maintenance and Equipment Facility, Building 32.	O&M
3	02-1016	Golf Maintenance and Equipment Facility, Building 33.	O&M
4	02-1078	Aerial Surveillance Radar, Building 420.	O&M
5	03-1003	Visiting Quarters, Building 314.	O&M
6	04-1003	Tower at Alert Facility, Building 571.	O&M
7	04-1004	Corrosion Control Utility Storage, Building 402, and Tank at Wash Rack.	O&M
8	04-1005	Pool and Associated Facilities at Club Altus, Buildings 300, 306, and 310.	O&M
9	04-1006	Sewer Treatment Plant, Building 389.	O&M
10	04-1007	Golf Course Pavements, Building 558.	O&M
11	04-1008	Swimming Pool at Alert Facility, Building 575.	O&M
12	04-1009	Alternate Tower, Building 558.	O&M
FY04			
1	90-3014A	Maintenance Dock, Building 510.	O&M
2	97-3014C	Base Engineer Maintenance Shop, Building 347	O&M
3	97-3014D	Base Engineer Covered Storage, Building 355.	O&M
4	97-3014E	Base Engineer Maintenance Shop, Building 356.	O&M
5	97-3014G	Storage Shed, Building 359.	O&M
6	98-1046	Underground Storage Tank, 397.	O&M
7	00-1004	Petroleum Operations, Building 382.	O&M
8	01-1099	Education Center, Building 155.	O&M
9	03-1061	Fire Station, Building 567.	O&M
10	07-1004	Petroleum Operations, Building 445.	O&M
FY05			
1	97-3014F	Base Engineer Administration, Building 357.	O&M
2	97-3014H	Base Engineer Administration, Building 362.	O&M

Key	Project No.	Project Description	Program
FY06			
1	07-1001	Fleet Service Terminal, Building 440.	O&M
2	07-1002	Housing Supply and Storage, Building 441.	O&M
FY07			
1	97-3014I	Base Engineer Covered Storage, Building 365.	O&M
2	98-1005	Operations Support, Building 369.	O&M
3	05-1001	Base Engineer Cold Storage, Building 373.	O&M
4	07-1006	Base Engineer Covered Storage, Building 447.	O&M
5	07-1007	Base Engineer Hazardous Storage, Building 449.	O&M
6	07-1008	Civilian Air Patrol Headquarters, Building 566.	O&M
7	07-1009	Visiting Quarters, Building 20.	O&M
8	07-1010	Temporary Living Facility, Building 21.	O&M
9	07-1011	Temporary Living Facility, Building 22.	O&M
FY08			
1	01-1100	Post Office, Building 325.	O&M
2	07-1003	Squadron Operations, Building 444.	O&M
3	07-1005	Fleet Service Terminal, Building 446.	O&M
4	08-1001	Visiting Quarters, Building 315.	O&M
5	08-1002	Visiting Quarters, Building 316.	O&M
FY09			
1	06-1001	Maintenance Dock, Building 523.	O&M
2	06-1002	Jet Engine Maintenance Shop, Building 503.	O&M
3	09-1001	Headquarters Group, Building 318.	O&M
4*	09-1002	Miscellaneous Parking Lots.	O&M

* = Basewide

Table 4.7 MINOR CONSTRUCTION PROGRAM

Figure

1 January 2003

Key	Project No.	Project Description	Program
FY03			
1	93-1019	Repair Water Distribution Main to Building 570, Alert Facility.	O&M
2	96-1014A	Repair HVAC System in Dining Hall, Building 317.	O&M
3*	97-1003	Repair Gas Service Lines and Meters.	O&M
4	97-1013	Alterations to Fuel Office, Building 506.	O&M
5*	98-1018P1	Replace Gas Mains and Valves, Phase 1.	O&M
6*	98-1018P2	Replace Gas Distribution System, Phase 2.	O&M
7	98-1058AA	Replace Sanitary Sewer Pipe and Manholes.	MFH
8*	98-1058G	Replace Manholes Basewide.	O&M
9	98-1101	Replace Wall Paper, Building 88.	O&M
10	99-1001	Paint Exterior and Interior of Bulk Storage Tanks.	O&M
11	00-1011	Repair and Replace Doors, Windows, and Walls, Building 342.	O&M
12	00-1026	Seal Cracks in POL Dikes, Facilities 464 and 465.	O&M
13	00-1078	Upgrade Primary Overhead Distribution Line Circuit A.	O&M
14	01-1021	Replace Sanitary Sewer Pipe and Manholes.	MFH
15	01-1025	Repair Water Line, Buildings 312 to 331.	O&M
16	01-1074	Repair Air Conditioning, Building 87.	O&M
17	01-1104	Restore Mobility Processing Area, Building 369.	O&M
18	01-5004	Construct Car Wash.	NAF
19	02-1028	Repair Ramp Drive at Row 20 to 27.	O&M
20	02-1057	Install Airfield Surveillance Cameras.	O&M
21	02-1059	Construct Turn Around at Main Gate.	O&M
22	02-1086	Construct Kitchen in Dormitory, Building 213.	O&M
23	02-1087	Repair Building 89 for C-17 Simulator.	O&M
24	03-1052	Blast Fence Extension.	O&M
25	03-1055	Restore Cathodic and Corrosion Protection of Water Tanks, Facility 341.	O&M

Key	Project No.	Project Description	Program
FY04			
1	98-1044G	Repair KC-135 Parking Apron.	O&M
2	98-1080	Replace HVAC Equipment, Building 39.	O&M
3	99-1032	Extend Transportation Maintenance Bay, Building 353.	O&M
4	00-1009	Upgrade Air Conditioning System and Insulate Building 215.	O&M
5	00-1059	Realign South Gate Traffic Lanes.	O&M
6	01-1047B	Alterations to Building 188.	O&M
7	01-1080	Replace HVAC Systems, Building 81 to 85.	O&M
8	01-1081	Replace Air Handler and Condensing Unit, Building 1.	O&M
9	01-4025	Repair East/West River Drainage Ditch in Family Housing.	MFH
10**	02-1069	Expand Acreage at Sooner Drop Zone.	O&M
11	04-5002	Construct Flight Kitchen, Building 185.	O&M
FY05			
1	93-1020	Replace Fire Alarm System in Hangar 435.	O&M
2*	95-1026	Replace Fire Alarm Systems in Multiple Facilities.	O&M
3	98-4003	Replace Stop Valve in Capehart Family Housing.	MFH
4	99-1003	Replace Boiler in Officers Club, Building 39.	O&M
5	01-1019P2	Repair Sanitary Sewer from Manholes 150 to C127.	O&M
6	TBD	Expand Computer Planning Room, Building 164.	O&M
FY07			
1	94-4003	Repair Storm Drainage in Bicentennial Family Housing.	MFH
2	04-3009	Renovate C-5 Squadron Operations Facility for C-17 Operations, Building 164.	O&M

* = Basewide

** = Sooner Drop Zone

Table 4.8 MAJOR CONSTRUCTION PROGRAM

Figure

1 January 2003

Key	Project No.	Project Description	Programmed Amount/Fund	
FY03				
1	95-1055	Revitalize Interior of Commissary, Building 16 *Modernize Commissary to meet the needs of today's customers.*	$1,860,437	O&M
2	96-1009	Replace Mechanical/Electrical System in Hangar 518 *Replace the electrical and mechanical systems and update the fire protection system to meet current standards. Hangar 518 is the only C-5 fuel system repair hangar on the base and the new systems are needed for the protection of the aircraft and personnel working on the aircraft fuel cells.*	$4,000,000	O&M
3***	97-1001	Overhead Electrical Distribution System to Underground, Phase I *Part of an ongoing program to remove all overhead electrical distribution lines and replace them with underground lines. This improves the reliability of the system and the base image.*	$2,200,000	O&M
4	97-1028	Repair Dormitory, Building 331 *Repair Building 331 to bring the facility to current dormitory standards.*	$950,000	O&M
5	98-1044MM	Repair 40's Row of Aircraft Parking Spots *Remove failed asphalt and base course. Install 20-inch concrete pavement at C-5 parking spots 41 to 43 and 45 to 47. Work will be accomplished in two separate phases due to mission requirement.*	$4,000,000	O&M
6	98-2000	Install Compressed Natural Gas Station *Install compressed natural gas station to meet mission needs.*	$1,500,000	O&M
7***	99-1010	Replace Base Water Mains, Phase 1 *Part of a phased program to replace old and deteriorated water mains.*	$950,000	O&M
8	99-1034	Remove Trees from Clear Zones *Trees growing in the approach-departure zones will be removed for the safety of the flying mission.*	$900,000	O&M
9	01-1047*	Additions and Alterations to KC-135 Tank Aircraft Maintenance Unit, Building 188 *Construct a 6,400 square-foot addition to the east side of Building 188. Addition will provide required space for tool room, lobby, parts storage, ready room, scheduling, and administrative offices.*	$1,200,000	O&M

Key	Project No.	Project Description	Programmed Amount/Fund
10	02-1027**	Drainage System and Grading in Clear Zone *The existing open drainage ditches will be replaced by regrading areas and installing underground concrete pipe conduits. This will remove an airfield waiver.*	$2,600,000 O&M
11	02-1045	Repair Showers in Buildings 213, 331, 333, and 335 *Repair showers to meet current needs and Air Force standards.*	$1,000,000 O&M
12	02-1053	Install Fencing PL3 Restricted Areas, Southwest Side *Construction of a new chain link fence meets regulation and replaces old barbed-wire fence.*	$2,100,000 O&M
13****	02-3002	Repair Road to Sooner Drop Zone *Repair eight miles of county road providing access to the Sooner Drop Zone. Remove existing surface and base course and stabilize subgrade and install base course and asphalt. This road is required to accommodate heavier than average vehicles to support the military mission.*	$3,700,000 O&M
FY04			
1	85-5043R1	Repair POL Dikes and Tanks *Replace existing earth dikes and basins with reinforced concrete wall dikes and slab-on-grade basins surrounding the JP-8 bulk storage tanks 379 and 381. Install cathodic protection and oil/water separator.*	$2,400,000 O&M
2	96-3003	South Warm Up Apron *This project replaces airfield pavements off of Taxiway D that are no longer structurally sound.*	$1,200,00 O&M
3	97-3014	Base Engineering Complex *Construct a Civil Engineer Complex for the maintenance, repair, operation, and constructions of base facilities, pavements, and utility systems in support of the base mission and individual and organizational customers. Currently these functions occupy 18 inadequate facilities spread throughout the base.*	$14,200,00 MCP
4***	98-1010	Overhead Electrical Distribution System to Underground, Phase II *Part of an ongoing program to remove all overhead electrical distribution lines and replace them with underground lines. This improves the reliability of the system and the base image.*	$2,300,000 O&M
5***	01-1004	Replace Base Water Mains, Phase 2 *Part of a phased program to replace old and deteriorated water mains.*	$950,000 O&M
6	02-1052	Restore Fencing PL3 Restricted Area, Northeast Side *Construction of a new chain link fence meets regulation and replaces old barbed-wire fence.*	$2,100,000 O&M

Key	Project No.	Project Description	Programmed Amount/Fund
7	04-3004☆ *	100-Person Visiting Quarters *Construct a 100-person Visiting Quarters facility to provide billeting for the C-17 mission increase. This facility will replace Building 313, which is being demolished.*	$12,000,000 MCP
8	04-4001	Privatize Family Housing *Convey 966 existing units for a privatization end state of 966 units on lease land. The life cycle cost for privatization is less than continued ownership.*	$3,156,000 MFH
9	TBD	Replace Industrial Sewer Mains *Existing industrial sewer mains are old and deteriorating.*	$1,000,000 O&M
FY05			
1***	99-1004	Overhead Electrical Distribution System to Underground, Phase III *Part of an ongoing program to remove all overhead electrical distribution lines and replace them with underground lines. This improves the reliability of the system and the base image.*	$2,520,000 O&M
2***	00-1005	Replace Base Water Mains, Phase 3 *Part of a phased program to replace old and deteriorated water mains.*	$800,000 O&M
3	01-1052	Replace Underground JP-8 Transfer Line *Replaces old and deteriorating fuel line that has been partially removed from service due to leakage.*	$2,100,000 O&M
4	02-3004*	Building 89 Modification for C-17 Simulator *Remodel the interior of Building 89 and the existing simulator bay to accommodate the functions required for the installation of the C-17 Weapons Systems Trainer. Student load will increase with the addition of C-17 aircraft, requiring more training facilities.*	$1,200,000 MCP
5****	04-3001*	Purchase 800 Acres for Assault Landing Zone *Purchase 800 acres of land at the Sooner Drop Zone to construct another assault landing zone. The existing assault landing zone is at capacity and cannot accommodate the increased C-17 flight training mission.*	$960,000 MCP
6****	04-3002*	Concrete Landing Zone at Sooner Drop Zone *Construct concrete assault landing zone, taxiways, fire department support facility, and lighting. An additional assault landing zone is needed to support the addition of C-17 aircraft part of the C-17 Plus-Up mission. The existing assault landing zone is at capacity for current student/aircraft population ratio.*	$16,600,000 MCP
7	04-3008☆	100-Person Visiting Quarters *Construct a 100-person Visiting Quarters facility to meet the billeting needs of the new C-17 Plus-Up mission. This facility will replace Building 314, which is being demolished.*	$12,000,000 MCP

Key	Project No.	Project Description	Programmed Amount/Fund
8	05-3002**	Consolidated Storage Facility *New facility replaces storage for lodging and dormitories furnishings kept in, Buildings 440 and 441. The existing buildings required an airfield waiver and are on the demolition list.*	$1,500,000 MCP
9	05-3007☆	Relocate Golf Course Holes *Relocate several golf course holes to open land for the extension of the north ramp and construction of a new two-bay hangar. This will accommodate future missions and is part of the 2030 Plan.*	$1,700,000 MCP
FY06			
1	93-3006	Replace Electric Switching Station *The construction of a new electric substation will provide backup electrical power to base facilities and meet Energy Security Program requirements. With a minor exception, all electrical power for the base is currently supplied by a single commercial source via a single base substation.*	$3,300,000 MCP
2	98-005P2	Repair Taxiways *Repair the asphalt shoulders and edge lighting of Taxiways C, D, E1, and F. Widen the width of Taxiway C from 50 feet to 75 feet, which will meet Air Force aircraft safety measure regulations.*	$17,000,000 MCP
3***	00-1003	Overhead Electrical Distribution System to Underground, Phase IV *Part of an ongoing program to remove all overhead electrical distribution lines and replace them with underground lines. This improves the reliability of the system and the base image.*	$2,700,000 O&M
4	01-3002☆	Wing Headquarters Facility *Construct a new Wing Headquarters Facility to meet the requirements of the 97th Air Mobility Wing and wing staff. The existing facility, built in 1954, is inadequate in size and configuration, and it cannot be expanded.*	$6,500,000 MCP
5	04-3003*	KC-135 Parking Apron Expansion *Install concrete paving at the north ramp K-135 parking apron to include hydrants, taxiways, grounding terminals, and taxilines. This expansion is needed to provide parking access for the planned two-bay maintenance hangar, which is required to support additional C-17 aircraft maintenance for the C-17 Plus-Up mission.*	$3,400,000 MCP

Key	Project No.	Project Description	Programmed Amount/Fund
FY07			
1***	01-1002	Overhead Electrical Distribution System to Underground, Phase V *Part of an ongoing program to remove all overhead electrical distribution lines and replace them with underground lines. This improves the reliability of the system and the base image.*	$1,240,000 O&M
2	03-3002**	TRML Fleet Services Facility *The construction of a new facility will eliminate space deficit and eliminate an airfield obstruction.*	$1,750,00 MCP
3	04-3005*	Hangar 517 Addition *Construct an addition to Hangar 517 to accommodate the sheet metal fabrication mission required for the C-17 Plus-Up mission.*	$1,000,000 MCP
4	05-3003**	Survival Equipment Shop *The construction of a new facility will eliminate an airfield obstruction.*	$3,250,000 MCP
5	07-3001	Replace Runway 17L/35R Outside Runway *Replace Runway 17L/35R, Parallel Runway.*	$9,300,000 MCP
6	07-3002	Replace Runway 173/353 Assault Strip *Replace Runway 173L/353R Assault Strip.*	$4,400,000 MCP
7	TBD	KC-135 Aircraft Maintenance Unit Facility *Construct a new KC-135 AMU facility. Currently the KC-135 mission is operating with facilities that do not meet the Air Force requirements for square footage. This deficit impacts the KC-135 refueling mission, which in turn affects the C-17 flying mission.*	$1,425,000 MCP
FY08			
1	97-1014	Addition, Alteration, and Repair of Chapel *Alteration and repair to the existing chapel will revitalize the facility and an addition will consolidate some the services now provided in other facilities.*	$923,700 O&M
2	02-3001✰	Fitness Center *Construct a second floor on Building 156, the existing Fitness Center. This expansion will include new group exercise and cardiovascular equipment rooms, renovation of areas for free and resistance weight training, and upgrading mechanical and electrical systems.*	$3,307,279 MCP
3	TBD✰	65-Person Visiting Quarters *The construction of a new 65-person visiting quarters is part of the 2030 Plan to accommodate new or expanded missions.*	$8,500,000 MCP

Key	Project No.	Project Description	Programmed Amount/Fund
FY09			
1	97-3001	Firing Range and Support Facility *Construct a 20-point baffled small arms range including two-point M-60 range. The support facility will house administration, classrooms, weapons maintenance shop, weapons cleaning room, and alarmed weapons and ammunition storage room.*	$2,100,000 MCP
2	TBD☆	80-Person Visiting Quarters *The construction of a new 80-person visiting quarters is part of the 2030 Plan to accommodate new or expanded missions.*	$10,250,000 MCP
FY10			
1	02-3003	Precision Measurement Equipment Laboratory *The new PME Laboratory will contain laboratory, offices, storage space, roll call area, breakroom, and restrooms. It will be designed and constructed to maintain positive pressure, be environmentally controlled in humidity and temperature, have dust filtration on exhaust ducts, and have specialized power and grounding requirements.*	$1,600,000 MCP
2	03-1010	Fuels Management Facility *Construct new fuels management facility.*	$2,000,000 MCP
3	05-3006☆	Collocated Club and Visiting Quarters *The construction of a new collocated club with accompanying visiting quarters is part of the 2030 Plan to accommodate new or expanded missions.*	$8,100,000 MCP
4	05-3008☆	Recreation Center *As part of the 2030 Plan, a new recreation center is needed to provide state-of –the-art services to increasing number of students. The existing facility may be phased out over several years.*	$2,500,000 MCP
FY12			
1	05-3005☆	Base Operations Facility *A new facility on the flightline will contain airfield operations, command post, OSS staff, intelligence, weather, passenger terminal, and flight kitchen. This consolidates scattered uses, which is part of the 2030 Plan initiative.*	$2,600,000 MCP
FY14			
1	05-3004☆	C-17/C-5 Squadron Operations Facility *A new facility to house two C-17 squadrons and one C-5 squadron. This consolidates these users, which is part of the 2030 Plan.*	$3,500,000 MCP

Key	Project No.	Project Description	Programmed Amount/Fund
FY16			
1	05-3001☆	Professional Military Education Center *Construction of the PME Center will consolidate First Term Airmen's Center, Advanced Leadership School, Honor Guard, and Education Center into one facility.*	$5,300,000 MCP
Outyears			
1	90-3014☆	Two-Bay Maintenance Hangar *Construct a two-bay maintenance hangar in which to perform general maintenance on assigned C-5 and KC-135 aircraft. Existing facilities are undersized, substandard, and scattered along the flightline.*	$16,200,000 MCP
2	96-3005B☆	Consolidated Aircraft Maintenance Unit *Presently the KC-135, C-5, and C-17 aircraft maintenance units are located in six separate inadequate facilities. The construction of the Consolidated AMU and Supply Facility will provide a fully functional and properly configured facility to house KC-135, C-5, and C-17 aircraft maintenance units and various support functions.*	$8,780,000 MCP
3	TBD☆	Extend North Ramp *Extension of the north ramp will accommodate the pull-in/pull-out parking of 18 C-17 aircraft and the NASA 747 shuttle.*	$24,000,000 MCP

☆ = 2030 Plan

* = C-17 Plus-Up

** = Corrects Airfield Waivers

*** = Basewide

**** = Sooner Drop Zone

Section 5.0

General Plan Maintenance and Revision

5.1 INSTALLATION AND COMMAND REVIEW PROCESS

The proponent of this General Plan (GP) for Altus AFB is the Base Civil Engineer. The civil engineering staff promotes and oversees the review effort. Attention must be given to the review of the GP by the Base Planning Staff, as this is an important tool used in base development. This document affects the Altus AFB's development activities, and consideration must be given to its distribution among major units.

The Air Education and Training Command (AETC), Directorate of Civil Engineering, reviews and approves this document for technical content and consistency with AETC goals and objectives and other planning documents

The US Air Force Center for Environmental Excellence (AFCEE) provides technical guidance on comprehensive planning issues.

Banner Change

5.2 CONTACTS FOR RECOMMENDATIONS AND CHANGES

Corrections, changes, additional information, or other data pertinent to this General Plan will be directed to:

Mr. Heath Sirmons
97 CES/CECP
401 L Avenue
Altus AFB, OK 73523-5138
(580) 481-7612

Informational copies will be furnished to:

Mr. Jack Siegel
AETC/CEVN
266 F Street West
Randolph AFB, TX 78150-4321
(210) 652-3959

5.3 UPDATING AND PRODUCTION

The Base Development Section is responsible for the biannual update of the General Plan. Those pages requiring changes will be developed, reproduced, and inserted into the General Plan notebook. The Base Development Section will keep a log of “GP notebook holders” to facilitate updating.

The 2003 General Plan was prepared by a consulting firm. Base development personnel will update Microsoft Word files and AutoCAD files and format report pages. The format of the report was developed so updating of the narrative Word files and electronic AutoCAD files can be done by base staff using on-

base personal computer (PC) software and hardware. The electronic maps are created using Tri-Service Standards. Report publishing can be done on base or by a contractor.

Software packages used in the development of the General Plan were Microsoft Word 2000 and AutoCAD, Version 2000.

For final reproduction, the report text was merged with map-based graphics (CAD files) and digitized photography using Microsoft Word 2000. Adobe Acrobat, Version 5.0, was used to publish the report in Portable Document Format (PDF).

The following two software applications were used for the original publication, but are not necessarily required for updating the report. Adobe Photoshop, Version 6.0, was used for conversion of digital photography; and Adobe Illustrator, Version 8.0, was used for conversion of CAD graphics to a format importable to Word.

For most efficient production of final report, various duplication methods were used:

- Notebook covers and spines were printed on a digital color copier. Artwork was printed from an Acrobat PDF file exported from the Microsoft Word layout.
- Tabs were printed on a digital color copier, then laminated and diecut. Artwork was printed from an Acrobat PDF.
- Text pages were printed on a digital color copier (output from Acrobat files created from Microsoft Word layouts).
- Map-based graphics pages (figures) were imprinted on a digital color copier – CAD files were saved as encapsulated postscript (eps), converted in Illustrator 8.0, assembled in Word, and output as Acrobat PDF files.

The report was printed on one side of the paper only, making it easier to update single pages, and bound within a three-ring notebook. Updated map-based graphics (CAD files) can be digitally produced and printed on a color ink jet plotter, then duplicated on a color copier.

All materials used in the original production of the report will be provided with the final submittal to Altus AFB. This includes Microsoft Word text files, Word layouts, AutoCAD files, and digital photography.

Appendix A

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SECTION 2.0 ALTUS AIR FORCE BASE 2030 PLAN

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Wing Headquarters Campus Area Development Plan

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Information developed with personnel from the 97th Civil Engineer Squadron, Altus Air Force Base, Oklahoma and HQ Air Education and Training Command, Randolph Air Force Base, Texas.

Appendix B

ACRONYMS AND ABBREVIATIONS

AAFES	Army-Air Force Exchange Service
AETC	Air Education and Training Command
AF	Air Force
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFI	Air Force Instruction
AFOSI	Air Force Office of Special Investigations
AFRC	Air Force Reserve Command
AICUZ	Air Installation Compatible Use Zone
AMC	Air Mobilization Command
AMTC	Air Mobility Training Center
AMU	Aircraft Maintenance Unit
AMW	Air Mobility Wing
ANG	Air National Guard
AORI	Airfield Obstruction Reduction Initiative
APZ	Accident Potential Zone
AST	Aboveground Storage Tank
BASH	Bird Aircraft Strike Hazard
BCP	Base Comprehensive Plan
BLM	Basic Load Master
CAD	Computer Aided Drafting
CCTS	Combat Crew Training School
CE	Civil Engineer
CEV	Civil Engineer Environmental Flight
CFIC	Central Flight Instructor Course
dB	Decibel
Det	Detachment
DNL	Day-Night Noise Level
DoD	Department of Defense
FIX	Facility Infrastructure Examination
FUB	Facilities Utilization Board
FY	Fiscal Year
GP	General Plan

HQ	Headquarters
HVAC	Heating, Ventilation, Air Conditioning, and Cooling Systems
IAP	Initial Accumulation Point
IRP	Installation Restoration Program
JLUS	Joint Land Use Study
JP	Jet Petroleum
kVA	Kilovolt-Ampere
MAC	Military Airlift Command
MARC	Metropolitan Area Planning Council
MCP	Military Construction Program
MFH	Military Family Housing
NAF	Non-Appropriated Fund
NASA	National Aeronautics and Space
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
PBX	Private Branch Exchange
PC	Personal Computer
PC	Pacer CRAG
PCB	Polychlorinated Biphenyl
PDF	Portable Document Format
POL	Petroleum, Oil, and Lubricants
PSI	Pounds Per Square Inch
PVC	Polyvinyl Chloride Pipe
QD	Quantity Distance
SAC	Strategic Air Command
SMU	Solid Waste Management Unit
SS	Spill Site
TAC	Tactical Air Command
TBD	To Be Determined
TLF	Temporary Living Facility
US	United States
USAF	United States Air Force
UST	Underground Storage Tank
VQ	Visiting Quarters
WW	World War
WFEC	Western Farmers Electric Cooperative

Appendix C

ACKNOWLEDGMENTS

The following persons were instrumental in the development of the General Plan.

Altus Air Force Base:

Allen, Steve, 38th CIG/GU
Anker, Lt Hans, 97th CES/CECP
Archbold, Lt Yasir, 97th CES/CERR
Bellon, James, 97th CES/CEVN
Brewer, Gwen, 97th AMW/PA
Carson, Lt Nadine, 97th CES/CEV
Compton, MSgt Jeff, 97th AMW/SCBV
Cooper, Dewey, 97th CE/CEVR
Gaston, TSgt Jon, 97th CS/SCXP
Hill, Sgt Mathew, 97th MDOS/SGOAB
Hoot, Thomas, 97th CES/CEC
Howard, Bron, 97th CES/CEOE
Jeffers, SSgt Greg, 97th CS/SCSV
Johnson, John, 97th CES/CEC
Johnson, MSgt Scott, 97th AMW/SCBV
Kelsey, TSgt Vince, 97th CES/CEHD
Kilpatrick, Lt Tom, OKC Composite Squadron/CAP
Lazenby, Bill, 97th CES/CEVC
Lundgren, Clare, 97th CES/CEOE
Lyons, James, 97th CS/SV
McCaughan, LtCol Rob, 97th CES/CC
Morrison, Altea, 97th CES/CEH
Nebling, Brenda, 97th AMW/PA
Phifer, Dennis, 97th CES/CEOE
Proffitt, William, 97th CES/CD
Putnam, Edward, 97th CES/CEV
Randall, Calvin, 97th CES/CEOE
Rawdon, Lt Jeff, OKC Composite Squadron/CAP
Robinson, Lt Brandon, 97th CS/SCX

Sellers, Jim, 97th CES/F1
Simonson, Paul, 97th CS/CEOFM
Simpson, Amn Rachel, 97th CS/SCXP
Sirmons, Heath, 97th CES/CECP
Staton, Dan, 97th CES/CEV
Swackhamer, Tom, 97th AMW/SE
Warden, SSgt Gene, 97th SC/SCXP
Wirth, Larry, 97th CES/CEOE

97th AMW/SCBV and Civil Air Patrol (CAP) provided additional photography.

HQ Air Education and Training Command:

Siegel, Jack, HQ AETC/CEVN, Randolph AFB, Texas, Command Planner

2002 Air Force Center for Environmental Excellence Assistance Team:

Siegel, Jack, HQ AETC/CEVN, Randolph AFB, Texas, Command Planner
Gillem, Mark, AIA, AICP, AFCEE Team Leader
Kessler, Patricia, AIA, Assistant Professor, Air Force Institute of Technology

Black & Veatch:

Webb, Bill, Partner-in-Charge
Lightle, Helen, AICP, Project Manager
Rooks, Earl, Project Planner
Versluys, John, Planner/Graphic Specialists
Reiff, Dan, Reiff Advertising & Design, Graphic Designer

Appendix D

AETC POLICY ON COMMANDER ENDORSEMENT OF BASE GENERAL PLANS

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

29 JUL 2002

MEMORANDUM FOR 12 FTW/CC 14 FTW/CC 17 TRW/CC 37 TRW/CC
42 ABW/CC 47 FTW/CC 56 FW/CC 71 FTW/CC
81 TRW/CC 82 TRW/CC 97 AMW/CC 314 AW/CC
325 FW/CC

FROM: AETC/CC
1 F Street, Suite 1
Randolph AFB TX 78150-4324

SUBJECT: AETC Policy on Commander Endorsement of Base General Plans

1. Our AETC bases produce the finest, best-trained airmen in the world—nobody does it better! We must do everything possible to ensure this continues in the future and that means we must plan and work with a vision in mind. Each of our bases has a General Plan that guides us in mission and facility decisions and must be kept current.

2. Our facilities, base layouts, and project programming are constantly changing due to age, new mission requirements, and environmental considerations. Each Wing Commander should keep his/her Base General Plan current and develop a long-range vision for the base. These plans are important not only to your installations but also to the long-term planning efforts at the headquarters. As these plans are updated, I want you to send them to HQ AETC/CE for appropriate staffing prior to my review.

3. An important point here is, if you want it to happen, it must be in the plan. This is vital, since many of our facilities are aging and will be replaced during the next 20-30 years. We must be thinking the facility issues long-range—a 2030 plan. It is also an opportunity to address many issues such as mission changes, force protection, and sustainability.

4. Should you have a question or require further information, please have your staff contact our POC, Mr. Jack Siegel, HQ AETC/CEVN, DSN 487-3656.

Donald G. Cook

DONALD G. COOK
General, USAF
Commander

Appendix E

ALTUS AIR FORCE BASE DESIGN PRINCIPLES

To achieve the vision of creating a town center, the AFCEE Assistance Team needed to develop a set of principles that could guide our effort. To do this, we took information from our surveys and studied several local town centers as well as AF designs.

Creating principles is fundamentally important. Too often, master plans are simply generic building footprints (typically squares or meaningless rectangles) that only respond to superficial requirements of size and access. Moreover, there is usually no way to check to see if these plans meet any larger vision other than scope. Design principles help us do this and can also serve as a checklist to ensure the design vision is actually met by the proposed plan.

We classified these principles into three primary categories: places, architecture, and circulation. It is important to note that all of these principles work together. Each one complements all the others. Alone they will not work well, but when implemented together, the synergistic effect becomes profound.

PLACES

1. Campus Development
2. Parade Grounds
3. Campus Quads
4. Force Protection
5. Safety

ARCHITECTURE

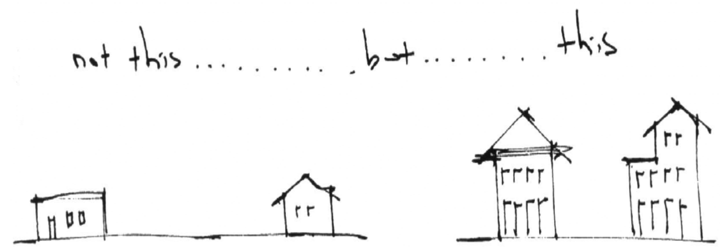
6. Multiple Use Facilities
7. Human Scale
8. Hidden Utilities
9. Varied Materials
10. Visible Entries
11. Arcades
12. Architectural Compatibility
13. Building Edge

CIRCULATION

14. Focal Points
15. Street Trees
16. Pleasant Walk
17. Attractive Parking

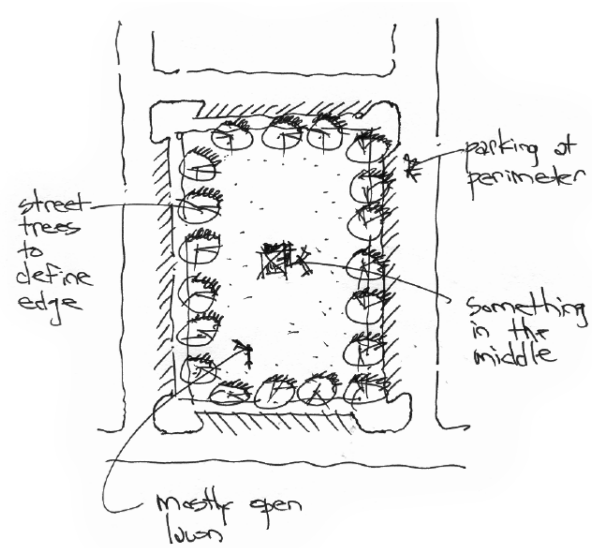
1. CAMPUS DEVELOPMENT

The current development at Altus is spread out with minor consideration of the flow between living, working and leisure activities. Although Altus' facilities are generally arranged in a walkable design, the site is not walking-friendly. The goal of our plan is to develop a compact, walkable site with a blend of single and multi-story buildings in close proximity to one another.



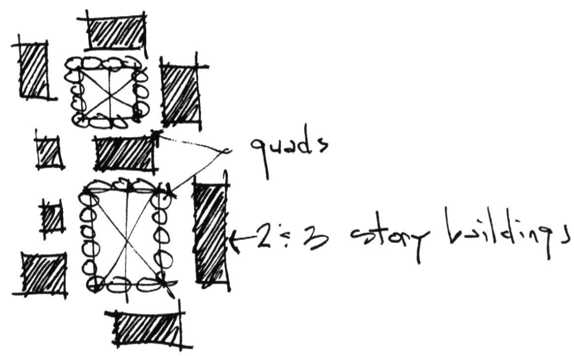
2. PARADE GROUND

A parade ground, like a public park or village green, creates a functional aesthetic hub where personnel can easily access facilities in support of both mission and morale functions. At Altus, the existing parade ground serves as the visual centerpiece for the base, providing a central greenspace from which roads, sidewalks and buildings are connected. Buildings should be located close to the edges along the streets that border the parade ground.



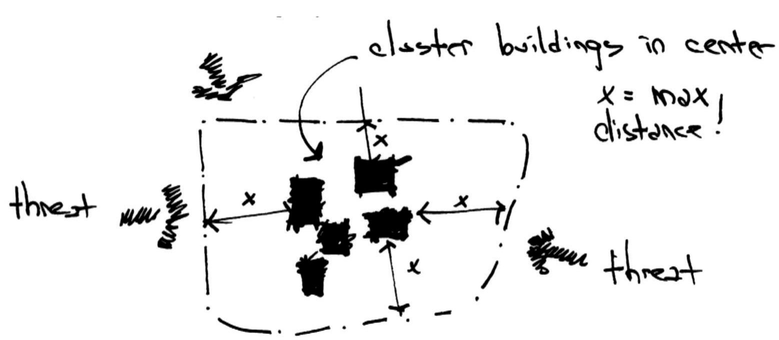
3. CAMPUS QUADS

The difference between a living space and a neighborhood is tremendous. Aligning buildings and public spaces in such a way as to promote interaction and free-flowing pedestrian activities create a neighborhood. At Altus, dormitories should be grouped into settings that create public quads or courtyards. Clustering related living facilities in distinct groupings, thus encouraging a unique cultural center, could foster unit pride.



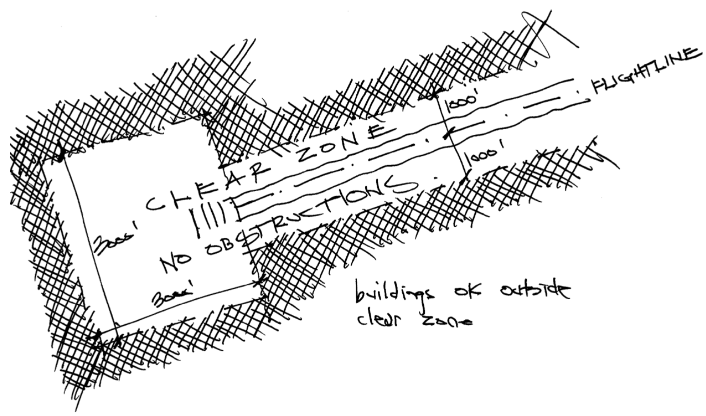
4. FORCE PROTECTION

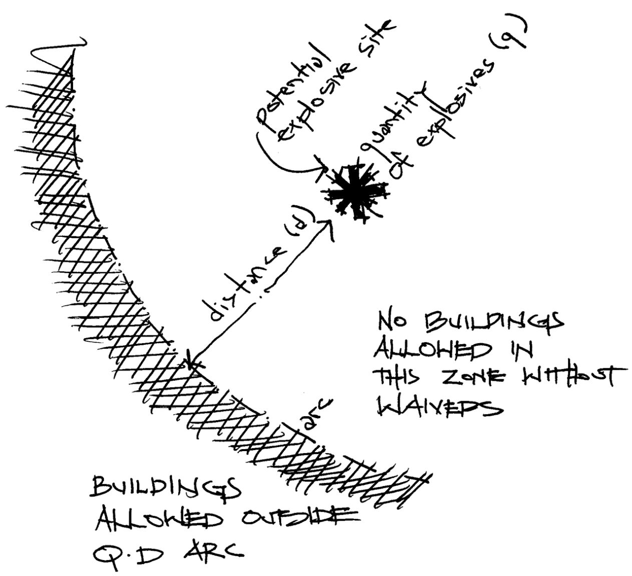
The most effective strategy to protect the human assets of an installation from terrorism is to increase the distance between the attacker and the target. Thus, the intent becomes to create open space buffers between buildings, roads and off-base development. In addition, gates should be located away from high threat facilities. Buildings should be clustered so that occupants can keep an eye on the exterior and on other buildings. Signs should be removed if they advertise the function or occupancy of a facility. Setbacks should be appropriate for the occupancy load and determined using calculations rather than simple “80-foot” checklists. In general, however, we should plan for 80’ setbacks from any building with an occupant load over 50 and the nearest road or parking area.



5. SAFETY

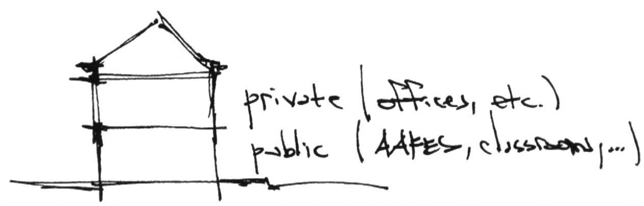
No permanently occupied facilities should be located within quantity-distance arcs for net explosive weights or aircraft clear zones. At Altus, the C-5 parking area, some of the C-17 area, and a small portion of the KC-135 area is within the airfield clear zone. It is essential to move these aircraft outside of this danger zones, and new construction and siting plans should prioritize safety as paramount.





6. MULTIPLE USE FACILITIES

Single-use, isolated facilities, whether for offices or community centers, make no sense on a base like Altus with limited land area. Think of successful town centers found in communities across the United States. These tows have shops, restaurants, etc., in addition to the entire range of the town's workforce—from offices to small workshops near the center of town. Follow this pattern by creating new facilities that incorporate a mix of compatible activities. Make these buildings multi-stories and place the more public functions on the ground level and private functions above. For example, a new collocated club should have visiting quarters above on the second and third floors, just like any hotel in the private sector where guest rooms are above the lobby, restaurants and bars. Noise can be easily dealt with using. The Hope Hotel at Wright Patterson is like this.

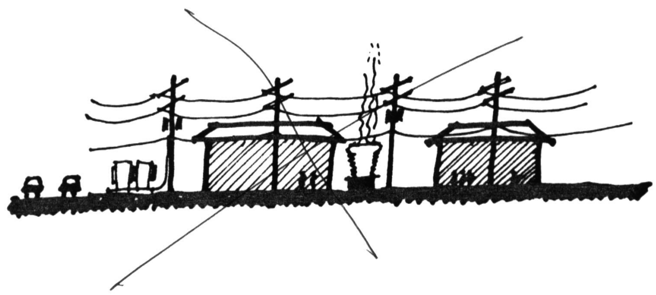


7. HUMAN SCALE

Facilities and installations are successful when they attend to the needs of the people that live work and play there. In order to do this the facilities must reflect the individuality, the human element, of those people. Enormous monoliths do not mirror the human element, but lend an impersonal, mechanical feeling. People are uncomfortable in these cold, unfriendly places. A human scale should be evidenced in the very concrete and steel of the facilities. Entrances, building heights, window and door sizes, walking distances, traffic/pedestrian interfaces should all be designed with the human form in mind. Elements like arcades (covered walkways at the edge of buildings), shorter street lamps, small fences, shallow setbacks, porches, vertically-oriented windows, and small scale materials like brick all give a human scale to the built environment.

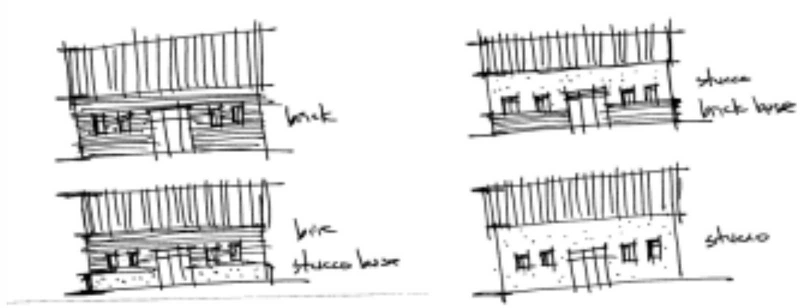
8. HIDDEN UTILITIES

Large stands of native trees provide dramatic backdrops and add a 3-dimensional feature to the overall look of a community. Overhead utility lines detract from the natural beauty of these trees and give the base a cold, industrial feel. Bury utilities where possible and screen unsightly aboveground utility structures. As utility and infrastructure upgrades are designed at Altus, this principle must be kept in mind to further facilitate the community feel.



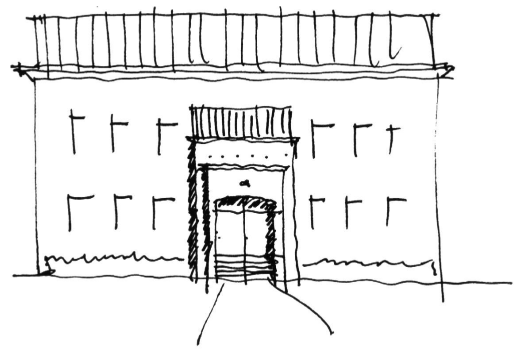
9. VARIED MATERIALS

Cost of materials should reflect the total life-cycle cost rather than the least initial cost. Proven, low maintenance materials such as brick (exterior) and high quality vinyl wallcovering (interior) stand the test of time and should be used to the greatest extent possible. It is also important to consider material variety in order to avoid a drab sameness that permeates many bases. The base should continue using brick as well as stucco since these materials work well together. Remember that architectural compatibility is more about complementing rather than copying.



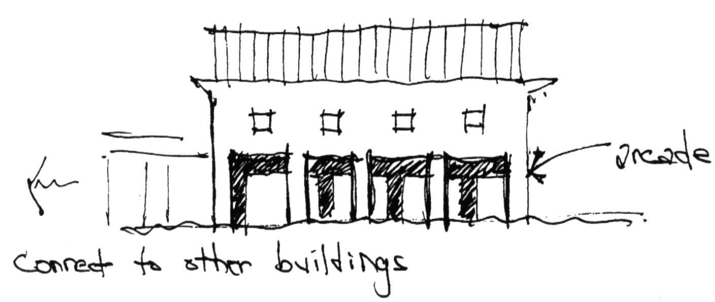
10. VISIBLE ENTRIES

When one enters Altus Air Base, there needs to be a dramatic, readily identifiable entry point. This serves as an obvious portal and sets a good, distinctive first impression of the base. The traffic circle with its static display is an excellent entry feature. This also applies to buildings. New building entries should be obvious and visible from a distance. The focal point is obvious to those approaching the club, and the open-column design creates an inviting entry.



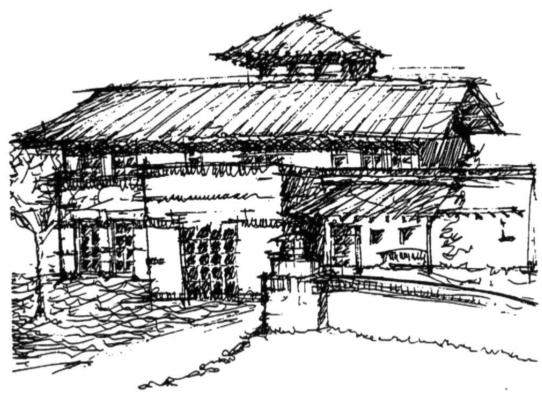
11. ARCADES

Covered walkways along the edges of buildings (arcades) are wonderful architectural features. They shield the building and pedestrians from the hot summer sun, protect the building pedestrians from rains, and help diffuse bright exterior light. Arcades also break up the large mass of buildings and add a more human scale to the built environment. Use arcades as much as possible and also use them to connect buildings to make them as continuous as possible. Keep the ceilings low (no more than 9 feet) and make the columns big enough to lean against.



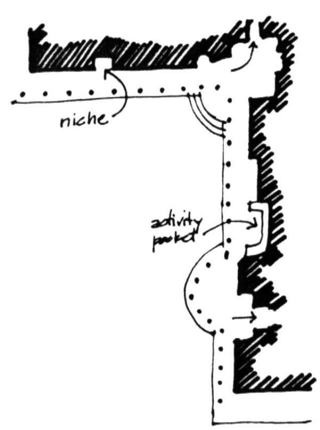
12. ARCHITECTURAL COMPATIBILITY

One of the most common responses to our survey question of “How would you describe the base as it can exist in ten years?” was a request for architectural compatibility. On a base like Altus, a consistency in building appearance is visually appropriate and further contributes to a small-town feel. The cornerstone for Altus is the new Visiting Quarters area – buildings with identifiable entries, pleasant outdoor space, stucco columns, brick exteriors, and a visible roofs. New building designs should incorporate the architectural features and design principles associated with these buildings. However, avoid the temptation to copy every element in a futile search for exact compatibility. Vary the materials. Use brick and stucco. Alter the colors slightly across the base while keeping within the earth tone theme.



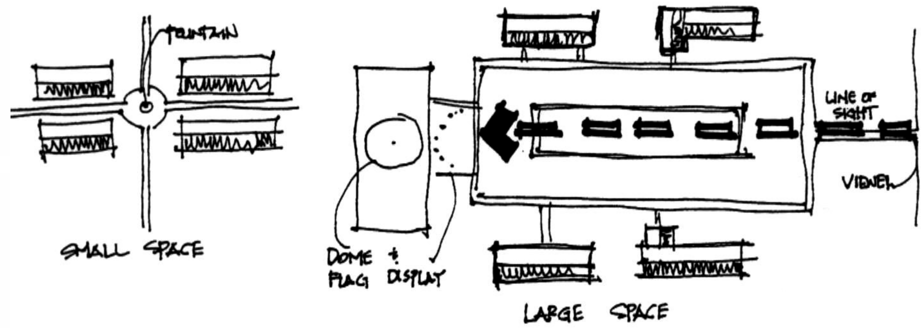
13. BUILDING EDGE

Building edges can provide definition for exterior spaces. They should not sharply cut the inside from out; transition is necessary. A wall without penetrations or human interaction or entry dehumanizes the exterior space. Soften these hard edges with inviting storefronts, landscaping, southern-style verandas, covered walkways and other human scaled elements and penetrations. Make the space around the building for people too; giving it a main street appearance.



14. FOCAL POINTS

Focal points should be used to draw interest and terminate paths. They become goals to walk to. Paths without a focus tend to be dull and feel too exposed. Scale these focal points to the space they terminate or highlight. Small space focal points may include fountains, sculptures, gardens or trees. Large ones may be aircraft displays, flags, towers or key buildings. Unintentional or inappropriate focal points, especially if numerous, dilute their meaning, and if landmark-sized, clutter the view. This plan designates several focal points, most notably the parade ground and the new Wing Headquarters.

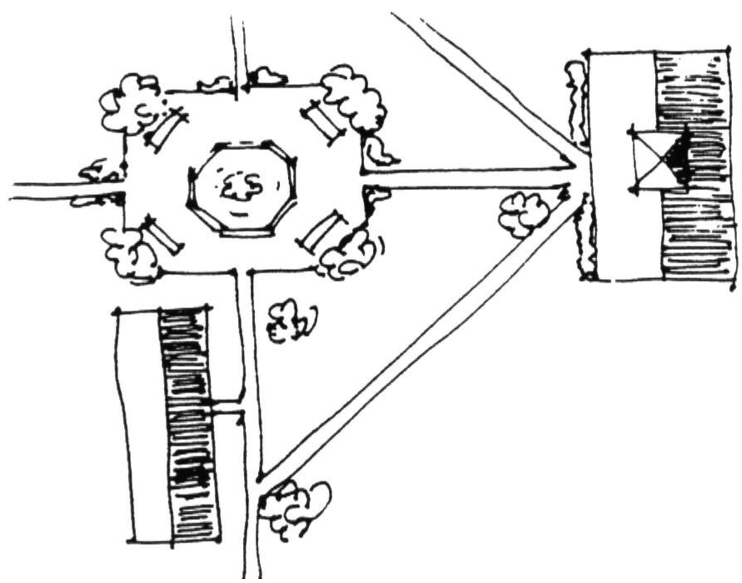


15. STREET TREES

Even the streets in modest areas gain a sense of grandeur when properly lined with trees. Streets without trees have no buffer between the noise of the traffic and pedestrians and working spaces. They can soften the transition from street to building, buffer noise, control dust and sunlight, provide much needed shade along sidewalks and safety for pedestrians, and help clean the air of pollutants. As landscaping elements, they can frame focal points, create a strong axis when used as a boulevard divider, and help ease the transitions from exterior to interior spaces. Plant street trees 25 to 30 feet on center. Regularly spaced street trees should be the principle element in Altus's landscape plan.

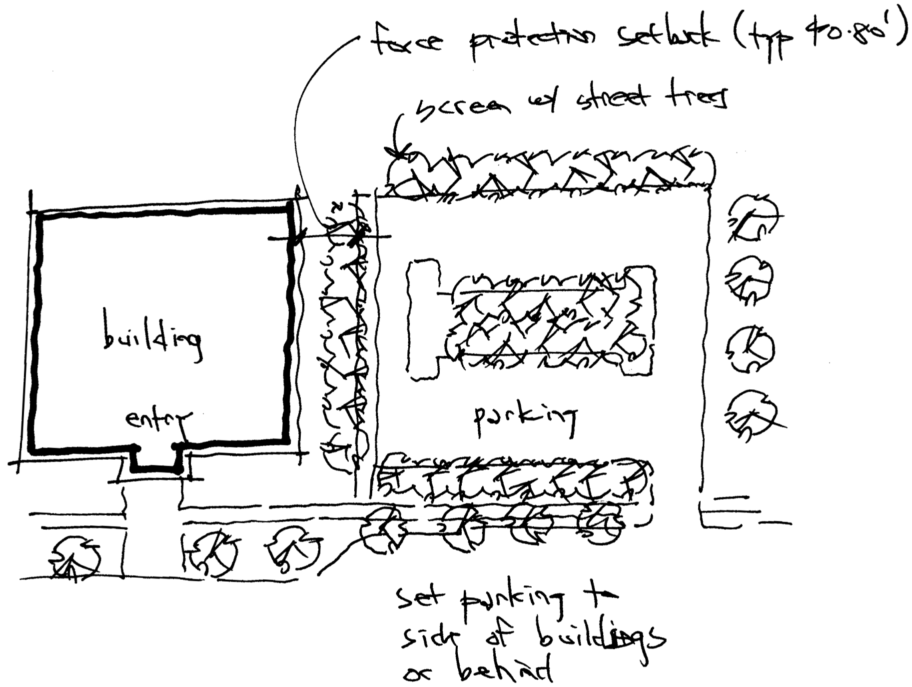
16. PLEASANT WALK

Adding sidewalks alone hardly encourages walking. Successful pedestrian environments use features that make the walk more than a logistical requirement. Some features that contribute to a pleasant walk are varied landscaping and paving, focal points, and places to sit at gathering spots. The walk must also have a purpose with a clear and direct route to follow and the distance should rarely exceed 1500 feet (or the distance it takes to walk in five minutes). Above all, provide shade and definition for these people streets. Undefined pathways that do not clearly identify vehicle and pedestrian circulation are dangerous, unsightly and disorienting. Provide a clear, simple and interconnected circulation plan. Use specific materials for each type of pathway, mark them well, and plan in landmarks. Be sure and separate the street curb from the sidewalk by at least a 5’ planter strip. This strip allows for street trees and keeps pedestrians safer by removing them from the road edge.



17. ATTRACTIVE PARKING

Parking needs to be convenient to the building it serves; however, it does not have to be an overpowering sea of asphalt so commonly seen in large suburban malls and strip centers and on most Air Force bases. As one person mentioned in our in briefing, it appears we design the parking lots first and the buildings second. Parking lots should be behind or to the side of buildings hidden from view. On-street parking can be used to reduce the demand for lots and improve pedestrian safety. Medians in parking lots should be wide enough to support a generous row of street trees (10-30 feet).




U.S. AIR FORCE

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
1	1. 97 OSS FONSI	1	Para 5	11	PS	57% increase in flight ops remained from first submission. This hasn't been explained to us from the prior review and still seems arbitrary. It does not address actual capability, but only extrapolates from old averages. It would not be physically possible to increase ops by such a number without increasing assigned aircraft for C-17 or personnel for KC-135 maintenance which is stated will not happen. (Reference PDEA document pg 5 lines 21-22 with no new mission or personnel assigned) We understand that it is the number generated and reported in this FONSI and GEAIP, but does not address why 57% was chosen to examine in the alternative	Per GEIAP program guidelines, the PDA has to reflect capacity for growth in installation aircraft operations. The prescribed method is to "scale" up baseline operations to a point that a significant impact could be reached. The analysis was presented in the Capability Analysis document. For Altus AFB, baseline operations could be increased by 57% without significant impact. Per e-mail from Jim Bellon, dated 4/29/09, no further action is required.
2	1. 97 OSS FONSI	2			PS	Our original comments from the Feb submission. Is there a consolidated response sheet?	Comment response table was submitted to Jim Bellon on 27 March along with the copy of the PDEA.
3	2. 97 OSS EA	1	5	21-22	PS	States no new missions or personnel will come to Altus as part of this study. Therefore the 57% increase in operations is an unrealistic analysis. See comment 4.	See response to Comment 1.
4	2. 97 OSS EA	2	6	1-7	PS	Privacy Advisory makes mention of public comments being included in the final version of the EA; when are these comments received from the public? How long, where and when does the public have a chance to view the Proposed alternatives to make comment?	The 30-day public comment period will begin once the Draft EA has been approved by Altus AFB and the notice of availability has been published in the local newspaper. Copies of the Draft EA will be mailed, along with a letter, to individuals and agencies included on the mailing list. Also, copies of the Draft EA will be delivered to the Altus AFB library and the community library to be available for review during the public comment period. Any comment letters received during the public comment period will be incorporated into an appendix, and substantive comments will be addressed in the text of the Final EA.
5	2. 97 OSS EA	3	2-7	Table 2-2	PS	Does not list construction of new consolidated Wing Command Center (Command Post, Emergency Ops Center, BaseOps/Wx Flight) on site of old fire station. Same as comment 4 from Feb submission.	Comment response table was submitted to Jim Bellon on 27 March along with the copy of the PDEA. Decision was made not to change the Proposed Action.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
6	2. 97 OSS EA	4	2-9	23	PS	57% increase in flight ops remained from first submission. This hasn't been explained to us from the prior review and still seems arbitrary. It does not address actual capability, but only extrapolates from old averages. It would not be physically possible to increase ops by such a number without increasing assigned aircraft for C-17 or personnel for KC-135 maintenance which is stated will not happen. (Reference PDEA document pg 5 lines 21-22 with no new mission or personnel assigned) We understand that it is the number generated and reported in this FONSI and GEAIP, but does not address why 57% was chosen to examine in the alternative	Per GEIAP program guidelines, the PDA has to reflect capacity for growth in installation aircraft operations. The prescribed method is to "scale" up baseline operations to a point that a significant impact could be reached. The analysis was presented in the Capability Analysis document. For Altus AFB, baseline operations could be increased by 57% without significant impact. Per e-mail from Jim Bellon, dated 4/29/09, no further action is required.
7	2. 97 OSS EA	5	2-9	23-24	PS	States there would be approx 242,273 annual operations. This is not equal to the number listed in Table 2-3 "Total Potential Average Annual Operations = 242,281"	Revised as requested.
8	2. 97 OSS EA	6	2-9	28-29	PS	The alternative growth in operations (the 57% listed in line 23) is stated as "assumes growth in the mission of existing aircraft." Without more people or aircraft, our operations PHYSICALLY CANNOT increase by 57%. 97 AMW cannot support longer flying hours/increased sortie rates/durations without more people or airplanes based on ATC, aircrew, and maintenance limitations.	See response to Comment 6.
9	2. 97 OSS EA	7	2-10	Table 2-3	PS	Page 2-9 line 23 states there would be approx 242,273 annual operations. This is not equal to the number listed in Table 2-3 "Total Potential Average Annual Operations = 242,281"	Revised as requested.
10	2. 97 OSS EA	8	2-10	Table 2-3	PS	Increase in Daily Operations % listed as 57% see comment 4 and 6.	See response to Comment 6.
11	2. 97 OSS EA	9	2-15	Table 2-6 Noise	PS	States that there are "very few" operations between 2200-0700 hours. There is still relatively active flying between 2200-0200 during summer months, don't know definition of "very few"	Text revised to read "in that less than 10 percent of flight…".
12	2. 97 OSS EA	10	2-15	Table 2-6 Land Use	PS	States that there are "very few" operations between 2200-0700 hours. There is still relatively active flying between 2200-0200 during summer months, don't know definition of "very few"	Text revised to read "in that less than 10 percent of flight…".
13	2. 97 OSS EA	11	3-5	Fig 3-2	PS	Quartz Mountain (AXS) Delegated Airspace depiction is incorrect. The AXS delegated airspace on the Class D depiction is missing the area South of W. Broadway and West of S. Main/Highway 283. See the embedded/attached diagram from the LOA. (or picture at end of comments sheet)	WESTON updated Figure based upon additional data received from Altus AFB.
14	2. 97 OSS EA	12	3-6	37	PS	Change "97th ARW" to "97 AMW"	Revised as requested.
15	2. 97 OSS EA	13	3-7	4	PS	Change "97th ARW" to "97 AMW"	Revised as requested.
16	2. 97 OSS EA	14	3-9	8-9	PS	References Fig 3-1 for depiction of LOP for Quartz Mountain Regional, Fig 3-2 looks to be more appropriate for this reference, also see comment 11 for correction to the depiction	Revised as requested.
17	2. 97 OSS EA	15	3-10	Table 3-1	PS	Henry Post Army Airfield, Fort Sill (KFSI), is not listed. It is a normal transition field for Altus assigned C-17 aircraft and we receive transient aircraft from there.	Revised as requested.
18	2. 97 OSS EA	16	3-10	17	PS	Change "97th AMW" to "97 AMW". Military convention drops the "th" if using abbreviated unit identifier (i.e. 97 AMW vs 97th Air Mobility Wing)	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
19	2. 97 OSS EA	17	3-10	23	PS	Change “97th AMW” to “97 AMW”. Military convention drops the “th” if using abbreviated unit identifier (i.e. 97 AMW vs 97th Air Mobility Wing)	Revised as requested.
20	2. 97 OSS EA	18	3-10	26	PS	Change “97th AMW” to “97 AMW”. Military convention drops the “th” if using abbreviated unit identifier (i.e. 97 AMW vs 97th Air Mobility Wing)	Revised as requested.
21	2. 97 OSS EA	19	3-16	12	PS	Change “97th AMW” to “97 AMW”. Do not use superscript “th”; Military convention drops the “th” if using abbreviated unit identifier (i.e. 97 AMW vs 97th Air Mobility Wing)	Revised as requested.
22	2. 97 OSS EA	20	4-1	30	PS	Add verbiage from page 2-2 lines 32-34: “Generally speaking, on an average busy day for Altus AFB, approximately 3 to 9 percent of installation air traffic, depending upon the airframe type, would use this new pattern.” To clarify impact/scope of total operations moving to the west pattern	Revised as requested.
23	2. 97 OSS EA	21	4-2	12-13	PS	Increase in aircraft operations listed as 57% see comment 4 and 6.	See response to Comment 6.
24	2. 97 OSS EA	22	4-2	31	PS	Increase in aircraft operations listed as 57% see comment 4 and 6.	See response to Comment 6.
25	2. 97 OSS EA	23	4-3	32	PS	Add verbiage from page 2-2 lines 32-34: “Generally speaking, on an average busy day for Altus AFB, approximately 3 to 9 percent of installation air traffic, depending upon the airframe type, would use this new pattern.” To clarify impact/scope of total operations moving to the west pattern	Revised as requested.
26	2. 97 OSS EA	24	4-4	11	PS	Add verbiage from page 2-2 lines 32-34: “Generally speaking, on an average busy day for Altus AFB, approximately 3 to 9 percent of installation air traffic, depending upon the airframe type, would use this new pattern.” To clarify impact/scope of total operations moving to the west pattern	Revised as requested.
27	2. 97 OSS EA	25	4-7	30, 32, 34	PS	Increase in aircraft operations listed as 57% see comment 4 and 6.	See response to Comment 6.
28	2. 97 OSS EA	26	4-7	31-34	PS	Numbers do not match with numbers listed in Table 2-3 (very close but not exact – why the difference?)	Revised as requested.
29	2. 97 OSS EA	27	4-8	18	PS	Annual operations number does not match with that listed in Table 2-3	Revised as requested.
30	2. 97 OSS EA	28	4-13	25	PS	States that there are “very few” operations between 2200-0700 hours. There is still relatively active flying between 2200-0200 during summer months, don’t know definition of “very few”	Text revised to read "in that less than 10 percent of flight…".
31	2. 97 OSS EA	29	4-19	35	PS	States that there are “very few” operations between 2200-0700 hours. There is still relatively active flying between 2200-0200 during summer months, don’t know definition of “very few”	Text revised to read "in that less than 10 percent of flight…".
32	2. 97 OSS EA	30	CA iii		PS	Delete reference to PAR Precision Approach Radar. Altus has shut down the equipment and no longer provides the service.	Capability Analysis was finalized in December 2008 and no additional edits have been made.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
33	2. 97 OSS EA	31	CA 1-2	Para 1 Bullet 1 Line 1, 3	PS	Total annual aviation operations numbers do not match numbers listed in Table 2-3 of PDEA (baseline and proposed)	Capability Analysis was finalized in December 2008 and no additional edits have been made.
34	2. 97 OSS EA	32	CA1-2	Para 1 Bullet 1 Line 5	PS	Increase in aircraft operations listed as 57% see comment 4 and 6.	Capability Analysis was finalized in December 2008 and no additional edits have been made.
35	2. 97 OSS EA	33	CA3-3	Para 5 Line 6	PS	Delete any reference to precision approach radar (PAR). Altus has shut down the equipment and no longer provides the service.	Capability Analysis was finalized in December 2008 and no additional edits have been made.
36	2. 97 OSS EA	34	CA3-5	Para 1 6	PS	Change “train pilots” to “train aircrew” More than pilots are trained at Altus: Loadmasters, Boom Operators, etc.	Capability Analysis was finalized in December 2008 and no additional edits have been made.
37	2. 97 OSS EA	35	CA3-8	Para 3.2.1 Line7	PS	Increase in aircraft operations listed as 57% see comment 4 and 6.	Capability Analysis was finalized in December 2008 and no additional edits have been made.
38	2. 97 OSS EA	36	CA3-12	Para 3	PS	THIS seems to explain the 57% increase number – based on RUNWAY THROUGHPUT CAPACITY. This needs to be spelled out better in the FRONT of the PDEA document. It is still a specious factor to base ALL calculations on because of the existing aircraft, manning and maintenance limitations contradict being able to support the increase without an increase in aircraft or personnel. The biggest assumption placed in the front of the PDEA is that there would not be additional aircraft or personnel included in the PDEA.	Per GEIAP program guidelines, the PDA has to reflect capacity for growth in installation aircraft operations. The prescribed method is to “scale” up baseline operations to a point that a significant impact could be reached. The analysis was presented in the Capability Analysis document. For Altus AFB, baseline operations could be increased by 57% without significant impact.
39	3. FACE-JSC	1	1-1	17-25	Maj Tubbs JACE-FSC	Need for the project ccould be better written. The following language from page 2-1 lines 33-35 could better support the need for the project. the projects included in the CIP [are needed to] provide for critical infrastructure required to achieve goals for installation development in accordance with the Installation General Plan. Recommend rewriting purpose consistent with the guidance above .	Sentence was already included on lines 19-21 on page 1-1. Text "are needed to" was added to sentence.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
40	3. FACE-JSC	2		GENERAL COMMENT	Maj Tubbs JACE-FSC	Section on PDA land use contains the following statement Further, Air Force regulations governing programming of funding, development of detailed site plans and construction drawings, and the letting of construction contracts would require individual records of environmental consideration, including compliance with NEPA and other pertinent environmental and occupational health and safety regulations. [emphasis supplied]. If there is recognition that each individual project will require NEPA analysis what is the point of considering the PDA as an alternative to the proposal? The PDA itself does not specifically identify what is to be constructed on any particular parcel nor does it actually identify any particular parcel of land for construction. How is this sufficiently identified to constitute a reasonable alternative? If a FONSI is contemplated for the PDA once a specific type of structure is identified for a specific parcel of land an environmental analysis would be required because those specifics would not have yet been analyzed. While other potential CATEX's may be applicable the use of 2.3.11 (Similar Actions) could be very questionable. Recommend articulating how this is a reasonable alternative. If it is unknown what buildings or ops are required, how does this meet the purpose and need?	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #3.
41	3. FACE-JSC	3	2-2	21	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Recommend replacing "The purpose" with "One purpose".	Revised as requested.
42	3. FACE-JSC	4	2-2	26-34	Maj Loertscher, AFLOA/JACE-FSC (ELO)	The percentages provided for operations in the proposed new pattern seem inconsistent. First, the paragraph states that "approximately forty percent of inside closed VFR traffic would be conducted to the new west pattern." A few senteces later, it states: "Generally speaking, on an average busy day for Altus AFB, approximately 3 to 9 percent of installation air traffic...would use this new pattern." It's difficult to see how these widely different percentages are possible. Additionally, the paragraph states: "This is a rough estimate for illustration purposes only." Why is an estimate used instead of actual percentages?	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #4.
43	3. FACE-JSC	5	2-9	Para. 2.5.1.1, lines 22-33	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Page 2-2, lines 21-23 state that the new closed west VFR pattern is part of the proposed action, while para. 2.5.1.1 states: "Additionally, under the PDA, the west closed traffic pattern is proposed." Which is correct?	Both alternatives include the west closed traffic pattern. Sentence was revised to read "Additionally, as under the Proposed Action, implementation of the PDA would incorporate the west closed traffic pattern. "
44	3. FACE-JSC	6	2-11	28	Maj Loertscher, AFLOA/JACE-FSC (ELO)	"Table 2-6" should be replaced with "Table 2-5".	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
45	3. FACE-JSC	7	2-13		Maj Tubbs JACE-FSC	Top of page indicates that Tabel 2-7 Summary of Impacts Continued. The previous page contains table 2-5. This appears to be a typo. Recommend correcting typo and changing to 2-5	Revised as requested.
46	3. FACE-JSC	8	2-13	Table 2-5, “Biological Resources”	Maj Loertscher, AFLOA/JACE-FSC	States: “No impacts to plant species.” Not sure that’s true for any construction project, unless all construction occurs on land that has already been developed. If all construction will take place on developed land, recommend includings that information in the table.	Text revised to read "No impacts to listed plant species or species of concern."
47	3. FACE-JSC	9	3-23	Line 28 and elsewhere, table of acronyms	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Recommend replacing “CAAA” with “CAA” throughout the document, including the table of acronyms. The statute is usually referred to as the “Clean Air Act,” even though it has been undergone significant amendments over the years.	Revised as requested.
48	3. FACE-JSC	10	3-32	Line 15	Maj Loertscher,	The acreage of Altus AFB is represented here as 4,735, but it’s previously represented as 4068. See p. 3-19, line 16 and page 3-20, Table 3-5. The numbers should be reconciled.	Revised as requested.
49	3. FACE-JSC	11	3-33	Line 16	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Recommend replacing “it is recommended that these buildings are ineligible for listing on the NRHP” with, “the circumstances support a determination that these buildings are ineligible for listing on the NRHP.”	Revised as requested.
50	3. FACE-JSC	12	3-33	Line 20	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Recommend replacing “94,500 square miles and through a five-state area” with “94,500 square miles across a five-state area”.	Revised as requested.
51	3. FACE-JSC	13	4-4	4.3.2.1 Noise	Maj Tubbs JACE-FSC	The articulated standard for significance for noise impacts appears to have 2 criteria. First an increase of 3 dbA DNL over a sensitive receptor and “In addition, based on AICUZ guidance, land-use compatibility recommendations begin when predicted noise exposure levels exceed 65dB DNL. As such, this can also provide an indicator as to when impacts could be considered significant.” With respect to this second standard it is unclear what the level of significance is? If the contours shift so that one area goes from 65-69 to 70-74 does that implicate the standard. Table 4-2 and Table 4-3 appear to indicate that more acreage will be subject to 70-74 dbA DNL and that more acreage on base will be subject to 80+ DNL. Without a clear statement as to what the criteria for significance is or without some sort of clear analysis with a conclusion it is difficult to discern whether the impacts will be significant with regard to the aircraft noise. Recommend clarifying the criteria and/or including a clear analysis with a conclusion as to significance	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON has 1) added additional details regarding land use analysis methodologies on Pg 4-17; 2) Droped the word “generally” in line 6 on pg 4-17; and 3) indicated that no noise sensitive receptors were identified under the expanded 65 DNL footprint. See Discussion #5.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
52	3. FACE-JSC	14	4-7	4.3.2.3	Maj Tubbs JACE-FSC	The articulated standard for significance for noise impacts appears to have 2 criteria. First an increase of 3 dbA DNL over a sensitive receptor and "In addition, based on AICUZ guidance, land-use compatibility recommendations begin when predicted noise exposure levels exceed 65dB DNL. As such, this can also provide an indicator as to when impacts could be considered significant." With respect to this second standard it is unclear what the level of significance is? Since Table 4-5 and Table 4-6 indicate that acreage within all of the sound contours would increase, how does this not create a significant impact. If more acreage is subject to the 65 dbA DNL that is at the very minimum level where land use issues are implicated, how does that not create a significant impact. Recommend clarifying the criteria and/or including a clear analysis with a conclusion as to significance.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON has 1) added additional details regarding land use analysis methodologies on Pg 4-17; 2) Droped the word "generally" in line 6 on pg 4-17; and 3) indicated that no noise sensitive receptors were identified under the expanded 65 DNL footprint. See Discussion #5.
53	3. FACE-JSC	15	4-12	Figure 2-1 and Figure 4-3	Maj Loertscher, AFLOA/JACE-FSC (ELO)	It seems strange that the noise contours don't bend more to the west if all VFR closed pattern operations were switched to the route depicted in Figure 2-1, especially considering the 57% increased operations under the PDA. Recommend double-checking to make sure the noise modeling fully takes into account the expected traffic in the proposed west pattern. Additionally, I have not been able to discern from the PDEA the number of operations will fly the west pattern under the proposed action or the PDA. That seems like information that should be included. It may be that the number of VFR operations is much smaller than the IFR operations, which would help explain why the noise contours don't bend more to the west under the proposed net pattern.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See discussion #6.
54	3. FACE-JSC	16	4-16	4.3.3.3	Maj Tubbs JACE-FSC	The land use analysis for the PDA is unclear. The articulated standard for significance is: "The Proposed Action or its alternatives could have a significant effect if they: 1) conflict in substantial fashion with existing land uses and master planning efforts undertaken by the installation or 2) conflict in substantial fashion with off-base land uses and master planning efforts of surrounding jurisdictions." Lines 5-6 of page 4-17 indicates that "land uses generally remain compatible within these levels." This does not appear to address the standard, land uses could remain generally compatible but in an isolated instance conflict in substantial fashion with off-base land use and master planning efforts. The analysis does not appear to specifically address the articulated standard. If the PDA does not conflict in substantial fashion say so, as written it is almost a non-answer to the articulated standard. Recommend analysis be written using the same terms as the standard for significance so that it may be clearly understood that the standard for significance is not being exceeded.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON has 1) added additional details regarding land use analysis methodologies on Pg 4-17; 2) Droped the word "generally" in line 6 on pg 4-17; and 3) indicated that no noise sensitive receptors were identified under the expanded 65 DNL footprint. See Discussion #7.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
55	3. FACE-JSC	17	4-25	4.3.5.3	Maj Tubbs JACE-FSC	PDA earth resource section does not appear to explicitly address the standard of significance which would be necessary to support a FONSI on the PDA. Effects on geology and soils could be significant if they alter the lithology, stratigraphy, and geological structures or change the soil composition, structure, or function within the environment. Recommend explicitly addressing the standard for significance in the PDA	Revised as requested.
56	3. FACE-JSC	18	4-26	4.3.6	Maj Tubbs JACE-FSC	Standard for significance with respect to biological resources is stated as follows: Impacts to biological resources could be considered significant if species or habitats of concern are adversely affected over relatively large areas of their range or if disturbances reduce population size or distribution. This would seem to miss out on a great deal of biological resources. Other animals or habitats (non TES or special concern) could be impacted and there appears to be no standard for significance for non TES. For instance it is possible the construction might lead to cutting of common trees. That would still yield an impact but one that really has not been assessed under any standard for significance. Recommend revising standard of significance to account for impacts to no TES species or habitats.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON defined habitat of concern such that it is clear that habitat of concern would include non-TES. See Discussion #8.
57	3. FACE-JSC	19	4-26	4.3.6	Maj Tubbs JACE-FSC	Affected environment section on biological resources lists wetlands yet there is no analysis of wetlands in this section. Either wetlands should not be identified as part of the affected environment or some analysis is required. Recommend verifying whether or not wetlands are to be analyzed and including analysis if required.	Analysis of wetlands was added to Chapter 4 as requested.
58	3. FACE-JSC	20	4-29	Para 4.3.7.2.3	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Recommend adding the following the end of the first paragraph of this section: “The additional developable land analyzed under the PDA does not include any buildings that were not analyzed as part of the proposed action. Therefore, development under the PDA would not result in adverse effects on any historic properties.” Then delete the last two paragraphs of this section.	Revised as requested.
59	3. FACE-JSC	21	4-30	4.3.8.1.1	Maj Tubbs JACE-FSC	The standard for significance with respect to surface water is articulated as: Impacts to surface water and groundwater resulting from the proposed or alternative actions could be significant if project activities resulted in substantial, long-term degradation of surface or groundwater water quality. The analysis of this section does not clearly address the impact on the water quality. There is no clear assessment of the duration of any impacts or of whether they would be substantial. They are described as being manageable. Recommend more clear application of the standard for significance.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON will expand on discussion of BMPs to control SW impacts. In narrative discussing implementation of BMPs, change instances of “should” to “would”. See Discussion #9.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
60	3. FACE-JSC	22	4-31	4.3.8.1.3	Maj Tubbs JACE-FSC	See comment immediately above, this section does address duration as short term but still does not clearly offer an analysis of how substantial the degradation to water quality would be. Recommend more clear application of the standard for significance.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON will expand on discussion of BMPs to control SW impacts. In narrative discussing implementation of BMPs, change instances of "should" to "would". See Discussion #9.
61	3. FACE-JSC	23	4-31	4.3.8.2.1	Maj Tubbs JACE-FSC	Section indicates that there will be no impact expected to ground water and then indicates that there is the potential for some impacts. With respect to the impacts it is not clear that the entire standard for significance has been applied Impacts to surface water and groundwater resulting from the proposed or alternative actions could be significant if project activities resulted in substantial, long-term degradation of surface or groundwater water quality. Impacts could also be significant if construction in flood plains or increases in impervious cover caused major disturbances in the natural flow, discharge, and recharge of water resources. The duration and substantial nature of the impacts are not clearly identified and the change to recharge capacity is described as negligible. Negligible is not defined elsewhere, it would be better to utilize the terms included in the standard, i.e. "not a major disturbance" Recommend revising analysis to more directly utilize the standard for significance.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON will expand on discussion of BMPs to control SW impacts. In narrative discussing implementation of BMPs, change instances of "should" to "would". See Discussion #9.
62	3. FACE-JSC	24	4-32	4.3.8.2.3	Maj Tubbs JACE-FSC	See comment above. PDA analysis needs more direct application of the specific standard for significance. The description of the impacts to recharge capacity is described as not substantial. The standard uses the term major. Recommend revising analysis to more directly utilize the standard for significance.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. WESTON will expand on discussion of BMPs to control SW impacts. In narrative discussing implementation of BMPs, change instances of "should" to "would". See Discussion #9.
63	3. FACE-JSC	25	4-32	4.3.8.3.1	Maj Tubbs JACE-FSC	With regard to the portion of the project that occurs in the floodplain, 32 CFR 989.14(g) requires that the EA discuss why no other practicable alternative exits to the construction. As it would appear that this is construction activities associated with the runway this should be easy to describe as needed improvements to an already existing runway. Recommend including information to provide support to the FONPA that will be necessary.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #10.
64	3. FACE-JSC	26	4-32	Para. 4.3.8.3.3	Maj Loertscher, AFLOA/JACE-FSC (ELO)	This paragraph states that the additional construction and demolition projects undertaken as part of the PDA "should not be located within delineated 100-year floodplains" (emphasis added). The use of the word "should" seems inconsistent with page 2-11, lines 4-9, which state that under the PDA, development will occur only in "developable" areas on Altus AFB, which are free from environmental constraints such as floodplain designation. Recommend replacing "should not" with "will not" in line 28.	Text was revised to read "would not".

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
65	3. FACE-JSC	27	4-34	4.3.9.1.2	Maj Tubbs JACE-FSC	It is unclear what the justification would be for application of the LBP household hazardous waste exemption. Much greater detail is required to assess whether this is permissible for the preferred alternative. Recommend providing additional detail to support the statement that the HHW exemption would apply for LBP in this instance.	Revised as requested.
66	3. FACE-JSC	28	4-33 through 4-35	"Hazardous Materials" Section	Maj Loertscher, AFLOA/JACE-FSC (ELO)	Para. 4.3.9 provides a standard for determining whether the impacts from hazmat will be significant: "Significant impacts could result if nonhazardous regulated or hazardous substances were collected, stored and/or disposed of improperly or if the volume of waste material exceeded the current management capacity of the installation." Most of the subparagraphs within this section fail to refer back to the standard, however. Recommend adding a reference to the standard in each subparagraph.	Text was revised in major subsections.
67	3. FACE-JSC	29	4-43	4.3.11.5	Maj Tubbs JACE-FSC	The standard for significance with respect to transportation does not appear to be clearly addressed. Utilizing the actual terminology included within the standard would be likely make the analysis easier to understand in terms of the significance of the impacts. Recommend revising section to utilize the terminology used it the standard for significance.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #11.
68	3. FACE-JSC	30	4-46	4.3.13	Maj Tubbs JACE-FSC	The standard for determining whether there are environmental justice issues is whether there are any disproportionately high and adverse human health or environmental effects of the programs, policies, and activities on minority population and low income populations. The analysis included does not appear to apply that standard. Recommend revising analysis so that it complies with EO 12898 in terms of disproportionate impacts.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #12.
69	3. FACE-JSC	31	4-47	4.4	Maj Tubbs JACE-FSC	Cumulative impacts section does not include any analysis. A cumulative impact is one which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non Federal) or person undertakes such action. [emphasis supplied]. It seems difficult to believe that the surrounding area would have no projects that were reasonably foreseeable for purposes of a cumulative impacts assessment. Recommend verifying that there are no non federal actions or actions by persons that are reasonably foreseeable.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #13.
70	3. FACE-JSC	32		FONSI/FONPA	Maj Tubbs JACE-FSC	Obviously this early in the project a draft FONSI/FONPA is not required, however prior to the publication of the document one should be included.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #10.
71	4. HQ AETC A7CP	1	Cover	1	Martin/ Erwin	Add "Environmental" between "Plan-Based" and "Impact."	Revised as requested.

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72	4. HQ AETC A7CP	2	Cover Sheet	N/A	Martin	Cover sheet should include the date comments must be received (the length of the comment period)	Revised as requested. Date for submission of comments will be added once the DEA has been staffed for public review of the document and the end of the public comment period has been determined.
73	4. HQ AETC A7CP	3	FONSI/FONPA	--	Martin/Erwin	Include draft with DEA when it is released for public comment.	Draft FONSI/FONPA will be included with public review copies of DEA.
74	4. HQ AETC A7CP	4	Cover Sheet	--	Martin/Erwin	Add date when comments are due.	Revised as requested. Date for submission of comments will be added once the DEA has been staffed for public review of the document and the end of the public comment period has been determined.
75	4. HQ AETC A7CP	5	Cover Sheet	Abstract	Martin/Erwin	There is no mention of the new VFR closed traffic pattern on the west side of Altus AFB either here or in Chapter 1. This is an important part of the proposed activities under both the Proposed Action and the PDA and cannot be omitted by oversight or negligence. Assessment of the new closed pattern is also not consistently included in Chapter 4.	Text was added to the Cover Sheet and Chapter 1 to briefly describe the closed traffic pattern on the west side of Altus AFB. Discussion of impacts from increase air operations was also added to Chapter 4 analysis.
76	4. HQ AETC A7CP	6	Cover Sheet	Abstract	Martin/Erwin	Per 40 CFR 1502.11 (e), the Abstract is supposed to be one paragraph. It is OK to have more than one paragraph, but as written, the first half of paragraph 2 repeats a lot of paragraph 1.	Abstract was revised to reduce duplication of explanation; however, there is still more than one paragraph.
77	4. HQ AETC A7CP	7	Cover Sheet	31	Martin/Erwin	Change “of any infrastructure” to “activities.” Not all proposed projects are related to infrastructure.	Revised as requested.
78	4. HQ AETC A7CP	8	II	1	Erwin	Change “Resources” to “Resource,” here and in text.	Revised as requested.
79	4. HQ AETC A7CP	9	III, V	9, 13	Erwin	Add dots between title and page number.	will be corrected just before publication
80	4. HQ AETC A7CP	10	VI	18	Erwin	Line up title of Figure 3-4.	will be corrected just before publication
81	4. HQ AETC A7CP	11	VII	1	Erwin	Recommend deleting superscript A from end of title.	will be corrected just before publication
82	4. HQ AETC A7CP	12	VII	4 & 5	Erwin	Line of table titles.	Revised as requested.
83	4. HQ AETC A7CP	13	VII	13-16	Martin/Erwin	Each table needs to have a unique title. Tables 4-2 and 4-5 have the same title. Tables 4-3 and 4-6 also have the same title. Make appropriate changes.	Revised as requested.
84	4. HQ AETC A7CP	14	VII	8	Erwin	“IRP” is not defined in this document. Do global search for “IRP” and replace with “ERP.”	Revised as requested.
85	4. HQ AETC A7CP	15	Acronyms	--	Martin/Erwin	CAAA – Change “Amendment” to “Amendments.”TSCA – Change “Substance” to “Substances.”A number of acronyms are missing, particularly from tables and figures, including, but not limited to: ALS, AMW, ARM, ATFP, CES/CEV, DASR, DV, FTAC, HAWC, HUD, HVAC, JLUS, NCO, OSI, PME, R/W, SDZ, and VOQ.	CAAA was revised to CAA - Clean Air Act as a result of Maj Loertscher's comment 9. ARM and HUD not found within the document. Other edits were made as requested.
86	4. HQ AETC A7CP	16	1-1	15	Erwin	Change “CIPs” to “CIP projects.” There is only one CIP, but many projects.	Revised as requested.
87	4. HQ AETC A7CP	17	1-5	1-7	Martin/Erwin	Cumulative impact analysis is inconsistent and lacking. Here it states cumulative impacts will be analyzed, but no other actions are identified in Section 2.6 or evaluated in Section 4.4.	As no concurrent actions have been identified during the scoping process, this paragraph was revised.
88	4. HQ AETC A7CP	18	1-6	13	Erwin	Change “utilities locations” to “utility locations.”	Revised as requested.

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89	4. HQ AETC A7CP	19	1-7	21	Martin/Erwin	Recommend deleting “mitigation” and its derivatives from this document, UNLESS there are significant impacts which must be mitigated to insignificance. Replace with “BMPs,” “measures to minimize or reduce impacts,” or some similar wording. Mitigation measures are supposed to be monitored and reported upon. Such formal reporting is not required for BMPs.	Revised as requested.
90	4. HQ AETC A7CP	20	2-1	37	Erwin	There are too many uses of “will” in this document. “Will” is pre-decisional. Recommend doing a global search and replacing “will” with “would.” Using “will” in Chapter 1 is OK.	Revised as requested.
91	4. HQ AETC A7CP	21	2-2	17	Erwin	Choose either “Additionally” or “also,” not both.	Revised as requested.
92	4. HQ AETC A7CP	22	2-2	21-23	Erwin	The new VFR closed traffic pattern is NOT the purpose of the Proposed Action. It is part of the Proposed Action, but it is not its purpose. Rewrite.	Revised as requested.
93	4. HQ AETC A7CP	23	2-3	Table 2-1	Erwin	Change baseline C-17 count from 15 to 12.	Revised as requested.
94	4. HQ AETC A7CP	24	2-3	Table 2-1	Martin	Propose Action End State does not add up to 36 as shown in the Table	Revised as requested.
95	4. HQ AETC A7CP	25	2-6	Figure 2-2	Erwin	Inconsistent. Per page 3-10, line 13, change “R/W 173/353” on Figure 2-2 to “R/W 17A/35A.”	Revised as requested.
96	4. HQ AETC A7CP	26	2-7	Table 2-2	Erwin	Description block 1, line 1: Add “be” between “would” and “sited.”Recommend NOT mixing English and metric measurements. Convert all SM to SF.	Revised as requested.
97	4. HQ AETC A7CP	27	2-11	23-26	Martin	It’s hard to believe that there are no other actions that have been announced for the City of Altus during this time period especially since the Home Web page for the city touts itself as being very welcoming to industry.	See response to Comment #69.
98	4. HQ AETC A7CP	28		Table 2-4	Martin/Erwin	Why is the ratio of impervious cover to additional facility space twice as much for the PDA as it is for the Proposed Action?	The Proposed Action includes a set number of projects with an approximation of the amount of impervious cover associated with each project. For the PDA, it is unknown what additional projects will occur (other than the PA projects). As a result, WESTON estimated the new construction to be commensurate with the current land use distribution on the installation. This includes the amount of impervious cover associated with each land use. The PDA method of estimating impervious cover is more conservative than the Proposed Action.
99	4. HQ AETC A7CP	29	2-13	Table 2-5	Martin/Erwin	Land Use: What about impacts off-base? Include. Air Quality: Is long-term increase in emissions from PDA significant? Earth Resources, PDA, line 1: Recommend deleting “however,” to de-emphasize 75%, which sounds significant. Biological Resources: What about impacts from increased aircraft operations? Add. Cultural Resources: SHPO concurrence is needed to support conclusions. HM&W, Proposed Action: Soil could also be contaminated with LBP. Add. HM&W, PDA: Increase in HW due to “new” aircraft maintenance is not discussed in Section 4.3.9.3, but should be. Add.	Text was revised as requested, with the following exceptions: For Earth Resources, text was changed to read "however, construction would occur on more of the developable land at Altus AFB."
100	4. HQ AETC A7CP	30	2-14	Table 2-5	Erwin	Socioeconomic Resources, PDA, line 7: At beginning of line, change “increase” to “increased.”	Revised as requested.

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101	4. HQ AETC A7CP	31	2-15	Table 2-6	Erwin	Noise, lines 3-7: Long, run-on sentence, with 2 verbs. Make appropriate changes. Biological Resources, line 2: Change "should" to "would." Line 3: Add "and species" between "habitat" and "living."	Revised as requested.
102	4. HQ AETC A7CP	32	3-1	20	Erwin	Change "1990's" (possessive) to "1990s" (plural).	Revised as requested.
103	4. HQ AETC A7CP	33	3-1	15-27	Erwin	Incomplete. I know C-5s were moved to Kelly Field, but what happened to B-52s and C-141s?	Revised as requested.
104	4. HQ AETC A7CP	34	3-2	4	Erwin	Change hyphen to dash.	Revised as requested.
105	4. HQ AETC A7CP	35	3-2	36	Erwin	Define acronym "NM" first time used.	Revised as requested.
106	4. HQ AETC A7CP	36	3-6	8	Erwin	Change "geography" to "geographic area."	Revised as requested.
107	4. HQ AETC A7CP	37	3-6	28-32	Erwin	Garbled. Are "Slow Routes" really for "high-speed activities?" Lines 30-32 need better punctuation. Rewrite.	Revised as requested.
108	4. HQ AETC A7CP	38	3-7	7	Erwin	Rewrite, deleting "routes," which is redundant.	Revised as requested.
109	4. HQ AETC A7CP	39	3-9	Table 3-1	Erwin	Lawton-Ft Sill is 43 NM from Altus AFB in which direction?	Revised as requested.
110	4. HQ AETC A7CP	40	3-10	30	Erwin	Define acronym "SDZ" first time used.	Revised as requested.
111	4. HQ AETC A7CP	41	3-12	4, 5	Erwin	Recommend using am/pm nomenclature instead of using hours nomenclature for designating times, throughout document.	Revised as requested.
112	4. HQ AETC A7CP	42	3-12	5	Martin/Erwin	How can a 6-hour activity occur at 11 o'clock? Recommend changing "at 2300 hours" to "after 10 pm."	Text revised to read "that lasts for 6 hours, every day and begins at 10:00 pm."
113	4. HQ AETC A7CP	43	3-12	Figure 3-4	Martin/Erwin	Figure is a little confusing. Is background noise 60 dBAs? Area in SEL box should equal area under curve, but it isn't. What is blue blob? If it is supposed to be a person, a stick man would be better. What are barbells across SEL box?	Figure was removed.
114	4. HQ AETC A7CP	44	3-12	Fig 3-4	Martin	The figure shown is not described in the text. All the symbols on the figure are not defined. For example: What does the blue Lego® looking and barbell looking symbols represent?	Figure was removed.
115	4. HQ AETC A7CP	45	3-13	Table 3-2	Erwin	Shouldn't "at" be changed to "of" in definition of acronym "NC?"	Revised as requested.
116	4. HQ AETC A7CP	46	3-14	Figure 3-5	Erwin	Acronym "Ldn" is not defined in this document. Recommend changing to "DNL."	Figure is not editable. Note was added below figure to read "Ldn is equivalent to DNL."
117	4. HQ AETC A7CP	47	3-16	20	Erwin	Inconsistent. Per Table 2-3, transient operations are less than 2%, not less than 3%. Be consistent.	Revised as requested.
118	4. HQ AETC A7CP	48	3-16	Table 3-3	Martin/Erwin	Inconsistent. Baseline land areas don't agree with those in Tables 4-2 and 4-5. Make appropriate changes.	Revised as requested.
119	4. HQ AETC A7CP	49	3-18	Figure 3-6	Erwin	Technically, colored noise blocks are decibel ranges (65-69 dB, 70-74 dB, 75-79 dB, and 80+ dB), not single decibel contours. Comment applies to other noise figures as well.	Revised as requested.
120	4. HQ AETC A7CP	50	3-16	22	Martin/Erwin	Why the inconsistent number of aircraft operations? Page 2-2, line 13, says 156,000. Table 2-3 on page 2-10 lists 154,316 operations. Here it states 159,000. Is the difference due to transients?	Revised to match Table 2-3.
121	4. HQ AETC A7CP	51	3-19	13	Erwin	Change comma to "and" between "Globemaster" and "the KC-135."	Revised as requested.
122	4. HQ AETC A7CP	52	3-19	16	Martin/Erwin	Why the inconsistent base acreage? On page 3-1, line 13, it 6,593 acres. Here it says 4068 acres. Is the difference due to the SDZ?	Revised as requested.

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123	4. HQ AETC A7CP	53	3-19	29-31	Martin	Sentence is redundant – need to take out “were the predominant aircraft” at the end of the sentence.	Revised as requested.
124	4. HQ AETC A7CP	54	3-19	29	Erwin	Define acronym “JLUS” first time used.	Revised as requested.
125	4. HQ AETC A7CP	55	3-19	31	Erwin	Delete “were the predominant aircraft.” Redundant.	Revised as requested.
126	4. HQ AETC A7CP	56	3-19	33	Erwin	Change “are” to “were.”	Revised as requested.
127	4. HQ AETC A7CP	57	3-19	37	Erwin	Explain “clear zones,” and “Accident Potential Zones I and II” on page 3-20, line 1.	Revised as requested.
128	4. HQ AETC A7CP	58	3-20	2	Erwin	Change “Runway” to “Runways.”	Revised as requested.
129	4. HQ AETC A7CP	59	3-20	11-12	Erwin	Airfield (46.1%) and open space (7.3%) does not approach 75%. Explain.	Text was revised to read "The majority of acreage on Altus AFB is devoted to airfield land uses, accounting for nearly 50 percent of the installation."
130	4. HQ AETC A7CP	60	3-20	Table 3-5	Martin/Erwin	What are “not classified” and “training?” Give examples. Having almost 20% as “not classified” is a lot.	These numbers come from the General Plan and GIS data acquired from Altus AFB. If more current data is available, the text can be revised.
131	4. HQ AETC A7CP	61	3-21	3	Erwin	What about off-base land uses and zoning?	Revised as requested.
132	4. HQ AETC A7CP	62	3-23	7	Erwin	Delete double “is.”	Revised as requested.
133	4. HQ AETC A7CP	63	3-27	18, 19	Erwin	Recommend converting all kilometer distances to miles, throughout document.	Revised as requested.
134	4. HQ AETC A7CP	64	3-28	Table 3-8	Martin/Erwin	Do Altus AFB baseline emissions include aircraft operations? If not, why not? Those emissions are needed to compare 57% increase in aircraft operations in PDA.	Aircraft emissions are not tracked at the base level. For purposes of analysis, baseline aircraft emissions were calculated using a model. Baseline and PDA Aircraft emissions are compared in Table 4-10.
135	4. HQ AETC A7CP	65	3-30	14	Erwin	That is less than half of base acreage! What about other acres?	Removed sentence in line 14. Acreages were from INRMP that do not match General Plan. In this case, description of vegetation on improved and semi-improved lands was more important than providing acreage of those lands.
136	4. HQ AETC A7CP	66	3-31	11	Martin/Erwin	Where are wetlands and/or floodplains on Altus AFB?	Chapters 3 and 4 were revised to include wetland information. Floodplains are addressed in Sections 3.3.8 and 4.3.8.
137	4. HQ AETC A7CP	67	3-32	15	Erwin	Another different base acreage (4,735 acres). Explain.	Revised as requested.
138	4. HQ AETC A7CP	68	3-32	21	Erwin	Change “proposing” to “proposed.”	Revised as requested.
139	4. HQ AETC A7CP	69	3-33	9	Erwin	Define acronym “VOQ” first time used. Change “Rapcon” to “RAPCON.”	Revised as requested.
140	4. HQ AETC A7CP	70	3-33	13	Erwin	Add closing parenthesis after closing square bracket.	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
141	4. HQ AETC A7CP	71	3-33	14-16	Martin	Only a Secretary of the Interior qualified professional can make the determination of whether or not a property is ineligible for listing on the NRHP. Furthermore, consultation with the SHPO will be required before the demolition of these structures.	Resource specialists who prepared the Cultural Resources sections of the EA are qualified professional (according to Secretary of Interior standards); however, text was added in Ch 3 and 4 to state that "SHPO concurrence would be required prior to demolition of any facilities."
142	4. HQ AETC A7CP	72	3-33	20	Erwin	Add comma after “miles” and delete “and through.”	Revised as requested.
143	4. HQ AETC A7CP	73	3-33	28	Erwin	Shouldn’t “northern” be changed to “eastern?”	Revised as requested.
144	4. HQ AETC A7CP	74	3-35	21	Erwin	Change “details” to “detail” to agree with plural subject “plans.”	Revised as requested.
145	4. HQ AETC A7CP	75	3-35	22	Erwin	Change “it” to “they.”	Revised as requested.
146	4. HQ AETC A7CP	76	3-35	26	Erwin	Change comma to period and start new sentence.	Revised as requested.
147	4. HQ AETC A7CP	77	3-35	28	Erwin	Change “where as disturbing painted surfaces” to “such that painted surfaces are disturbed.”	Revised as requested.
148	4. HQ AETC A7CP	78	3-35	29	Erwin	Delete “of” between “commencing” and “any.”	Revised as requested.
149	4. HQ AETC A7CP	79	3-38	Table 3-9	Erwin	Description block 3, line 7: Delete double period at end. Description block 4, line 2: Delete “is” between “contamination” and “from.”	Revised as requested.
150	4. HQ AETC A7CP	80	3-39	3	Martin/Erwin	Where are other MMRP sites? Off-base?	Text revised to read "In addition to the IRP, Altus AFB also has a Military Munitions Response Program (MMRP)."
151	4. HQ AETC A7CP	81	3-39	32, 35	Erwin	Were there 151 or 152 non-reportable mishaps? Be consistent.	Revised as requested.
152	4. HQ AETC A7CP	82	3-39	35, 37	Erwin	On both lines, change “non-recordable” to “non-reportable.”	Revised as requested.
153	4. HQ AETC A7CP	83	3-41	4	Erwin	Change comma to semicolon between “Altus” and “the Quartz Mountain reservoir.”	Revised as requested.
154	4. HQ AETC A7CP	84	3-41	14	Erwin	Add “and” between “mains” and “service,” and add comma after “service lines.”	Revised as requested.
155	4. HQ AETC A7CP	85	3-44	18	Erwin	Change “has” to “as.”	Revised as requested.
156	4. HQ AETC A7CP	86	3-44	21	Erwin	Add “and” between “mains” and “service,” and change “are” to “is” after “service lines.”	Revised as requested.
157	4. HQ AETC A7CP	87	3-44	31, 33	Erwin	On both lines, change “an” to “a” before numbers.	Revised as requested.
158	4. HQ AETC A7CP	88	3-44	37	Erwin	Why the turnaround in population growth?	Data was acquired from the OK Department of Commerce and no explanation was provided as to why the population was expected to increase.
159	4. HQ AETC A7CP	89	3-45	3	Martin	Change 0.6 to 1.6. (100% are married, and 60% have one child.) Is it realistic to assume all off-base military have no dependents? No. Recommend deleting “and no off-base military dependents” since they don’t consume or generate on-base utilities.	Revised as requested.
160	4. HQ AETC A7CP	90	3-45	5	Erwin	What are “private business” personnel? Contractors? NAF employees? Explain.	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
161	4. HQ AETC A7CP	91	3-47	11-12	Martin/Erwin	If there is no demographic data available for Altus AFB, how can we say there are no minority and low-income populations present at Altus AFB? Recommend changing the sentence to "Since there is no demographic data available for Altus AFB, the demographic data for the City of Altus will be used for the environmental justice analysis of the entire ROI (both Altus AFB and the City of Altus)."	Revised as requested.
162	4. HQ AETC A7CP	92	3-48	23	Erwin	Incomplete. Both the Proposed Action and the PDA include aircraft operations. Make appropriate changes.	Revised as requested.
163	4. HQ AETC A7CP	93	4-2	5	Erwin	Add "change in" at beginning of line, before "impacts."	Revised as requested.
164	4. HQ AETC A7CP	94	4-2	11	Erwin	Add "it" between "nor would" and "result in."	Revised as requested.
165	4. HQ AETC A7CP	95	4-2	19-28	Martin/Erwin	Understandable except for penultimate sentence. On line 26, change "prevent" to "prevents" to agree with singular subject "lack." ATC should be preventing civil users from using SUA when it is active. On line 27, should "active" be changed to "inactive?"	Revised as requested. Sentence was removed because same concept was presented in previous sentence.
166	4. HQ AETC A7CP	96	4-2	31	Erwin	Add "they" between "nor would" and "be necessary."	Revised as requested.
167	4. HQ AETC A7CP	97	4-4	30-33	Martin/Erwin	Noise impacts need to be discussed as areas (with a range of decibels) not a single decibel contour line. Rewrite.	Revised as requested.
168	4. HQ AETC A7CP	98	4-7	31-34	Erwin	Yet more sets of numbers for aircraft operations! Make Table 2-3 and text consistent.	Revised as requested.
169	4. HQ AETC A7CP	99	4-8	--	Erwin	Why aren't the 2000+ acres now exposed to 65 dBAs under the PDA considered a significant impact? Because the increase in noise is imperceptible (< 3 dBA)? Because there are few, if any, receptors? Because the new noise contours are "substantially" less than those in the pre-1999 AICUZ study? If we are making comparisons with the AICUZ study, shouldn't those contours be included in the figure(s)?	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #5.
170	4. HQ AETC A7CP	100	4-16	15	Erwin	Change "Land use would not be impacted" to "There would be no change in impacts to land use."	Revised as requested.
171	4. HQ AETC A7CP	101	4-16	20-21	Martin/Erwin	93 acres is increase in impervious cover, not increase in developed land. Not sure how many acres are currently considered to be developed. Make appropriate changes. Change "the DOPAA" to "Section 2.5.1.2."	Revised as requested.
172	4. HQ AETC A7CP	102	4-16	22	Erwin	Change "is" to "are" at beginning of line to agree with plural subject "locations."	Revised as requested.
173	4. HQ AETC A7CP	103	4-17	14-18	Erwin	Consider moving to Section 4.3.3.4.	Revised as requested.
174	4. HQ AETC A7CP	104	4-19	7	Erwin	Add "of" at beginning of line.	Revised as requested.
175	4. HQ AETC A7CP	105	4-19	8	Erwin	Change "facilities" to "facility."	Revised as requested.
176	4. HQ AETC A7CP	106	4-19	11	Erwin	Change "is one of" to "are."	Revised as requested.
177	4. HQ AETC A7CP	107	4-19	26-27	Erwin	Rewrite, deleting "Saint Andrews Sound and East Bay."	Revised as requested.
178	4. HQ AETC A7CP	108	4-20	3		The Proposed Action and PDA also include changes to aircraft operations. Make appropriate changes.	Revised as requested.
179	4. HQ AETC A7CP	109	4-20	11	Erwin	Change "Appendix A" to "Appendix C."	Revised as requested.
180	4. HQ AETC A7CP	110	4-21	16-17	Erwin	Delete "established cost estimating methodologies" because we are estimating emissions, not costs.	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
181	4. HQ AETC A7CP	111	4-21	22, 27	Martin/Erwin	On both lines, change “Table 4-1” to “Table 4-8.”	Revised as requested.
182	4. HQ AETC A7CP	112	4-21	31, 32	Erwin	On both lines, change “will” to “would.”	Revised as requested.
183	4. HQ AETC A7CP	113	4-21	40	Erwin	Delete first “be.”	Revised as requested.
184	4. HQ AETC A7CP	114	4-22	15	Erwin	Change “will” to “would.”	Revised as requested.
185	4. HQ AETC A7CP	115	4-23	9	Erwin	Delete first “be.”	Revised as requested.
186	4. HQ AETC A7CP	116	4-23	14	Erwin	Change “will” to “would.”	Revised as requested.
187	4. HQ AETC A7CP	117	4-23	21	Erwin	Change “Appendix A” to “Appendix C.”	Revised as requested.
188	4. HQ AETC A7CP	118	4-22 & 4-23	Tables 4-8 & 4-9	Erwin	Change titles to “Expected Emissions for Proposed Action (or PDA) Construction/Renovation/Demolition By Year.”	Revised as requested.
189	4. HQ AETC A7CP	119	4-24	Table 4-10	Martin/Erwin	What is total increase in annual emissions? Needs to include Table 4-9 emissions. If so, are NOx and SOx emissions significant because they are greater than 10% of regional emissions?	The emissions in Table 4-9 are short-term construction emissions that are eliminated once the construction has been completed. They are not to be included with the long-term emissions (Table 4-10) from base mission change (increased aircraft).
190	4. HQ AETC A7CP	120	4-24	6-12	Erwin	Per page 3-27, line 22, the regional haze rule doesn’t apply to Altus AFB. If that is so, delete these lines.	Revised as requested.
191	4. HQ AETC A7CP	121	4-24	14-18	Erwin	Are there any BMPs for aircraft operations? If so, include.	WESTON is not aware of BMPs for aircraft operation.
192	4. HQ AETC A7CP	122	4-25	32	Erwin	Delete “that” between “cover” and “would be.”	Revised as requested.
193	4. HQ AETC A7CP	123	4-26	5	Erwin	Change “should” to “would.” “Should” is too iffy. It sounds like the BMPs are supposed to be implemented, but they don’t have to be. If the BMPs are appropriate, assume they “would” be undertaken. Comment applies throughout document.	Revised as requested.
194	4. HQ AETC A7CP	124	4-26	14-16	Erwin	Delete.	Revised as requested.
195	4. HQ AETC A7CP	125	4-27	2-10	Erwin	Any potential impacts due to 57% increase in aircraft operations?	Revised as requested.
196	4. HQ AETC A7CP	126	4-27	17	Erwin	Add “and species “between “habitat” and “living.”	Revised as requested.
197	4. HQ AETC A7CP	127	4-28	6, 19	Erwin	On both lines, delete “an” before “unknown.”	Revised as requested.
198	4. HQ AETC A7CP	128	4-28	8-9, 21-22	Erwin	Change all instances of “should” to “would.” If appropriate, add “per the Altus AFB ICRMP” at the end of each section.	Revised as requested.
199	4. HQ AETC A7CP	129	4-28	33-35	Martin/Erwin	Reference SHPO’s concurrence that 8 buildings are ineligible for listing on the NRHP. Was SHPO’s concurrence sought for other 3 buildings? What was the result? Comments also apply to page 4-29, lines 15-17.	SHPO coordination will occur concurrent with the public review of the Draft EA. Once comments from the SHPO are received, they will be included in the Final EA.
200	4. HQ AETC A7CP	130	4-29	29	Erwin	After “floodplains,” add “and/or wetlands.”	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
201	4. HQ AETC A7CP	131	4-30	10-13	Martin	6 projects? Only 5 are listed. Make appropriate changes.	Revised as requested.
202	4. HQ AETC A7CP	132	4-30	17	Erwin	Inconsistent. Table 2-2 says 757,747 SF, not 687,417 SF as stated here. Make appropriate changes.	Revised as requested.
203	4. HQ AETC A7CP	133	4-30	22	Erwin	Add period between “cfs” and “The increased.”	Revised as requested.
204	4. HQ AETC A7CP	134	4-30	27-31	Erwin	Consider moving to Section 4.3.8.1.4.	Revised as requested.
205	4. HQ AETC A7CP	135	4-31	1	Martin/Erwin	108% increase! This would be significant. Change 108% to 12.6%. (100 x 93/740.84) This may also be significant, but it is more reasonable.	Revised as requested
206	4. HQ AETC A7CP	136	4-31	3	Erwin	Change second “increase” to “increased.”	Revised as requested.
207	4. HQ AETC A7CP	137	4-31	6	Erwin	7 outfalls? Per Section 3.3.8.1, there are only 5. Make appropriate changes.	Revised as requested
208	4. HQ AETC A7CP	138	4-31	7	Erwin	Add “so” between “outfalls” and “as to ensure.”	Revised as requested.
209	4. HQ AETC A7CP	139	4-31	1-14	Martin/Erwin	Confusing paragraph. Short vs. long term impacts. Should a new paragraph be started on line 8? Base-wide SWPPP vs. site specific SWPPP. Seems redundant. Conclusion is there are no impacts, but paragraph leaves reader wondering if storm water drainage system can handle increased runoff. Try again.	Paragraph was revised. Site-specific SWPPP provides BMPs specific to that construction site. Base-wide SWPPP provides BMPs for the entire base. Text added to clarify impacts - "Under the PDA, upgrades to the storm drain system would be included as part of installation development. "
210	4. HQ AETC A7CP	140	4-31	19	Erwin	What do “water-saving devices” have to do with surface water quality? Consider moving to Section 4.3.11.7.	Paragraph was revised.
211	4. HQ AETC A7CP	141	4-31	23	Erwin	Add “to” between “expected” and “impact.”	Revised as requested.
212	4. HQ AETC A7CP	142	4-32	5	Erwin	Delete double period.	Revised as requested.
213	4. HQ AETC A7CP	143	4-32	9	Erwin	Sentence fragment. Make appropriate changes.	Revised as requested.
214	4. HQ AETC A7CP	144	4-32	10	Erwin	Add “of” between “quality” and “groundwater.” Change “from” to “of” after “result.”	Revised as requested.
215	4. HQ AETC A7CP	145	4-32	18-19	Martin/Erwin	Recommend a FONPA, with justification, be prepared.	Comment resolved as per Altus PDEA Resolution Notes sent via e-mail on 5/15/09. See Discussion #10.
216	4. HQ AETC A7CP	146	4-33	4	Martin/Erwin	Include changes in aircraft operations.	Revised as requested.
217	4. HQ AETC A7CP	147	4-33	29	Erwin	Add comma between “facility” and “97 CES/CEV. Delete “be” between “must” and “review.”	Revised as requested.
218	4. HQ AETC A7CP	148	4-33	30	Erwin	Change “will” to “would.”	Revised as requested.
219	4. HQ AETC A7CP	149	4-33	33	Erwin	Change “property” to “properly.”	Revised as requested.
220	4. HQ AETC A7CP	150	4-34	18	Martin/Erwin	Change “Section 4.3.9.1.1.2” to “Sections 4.3.9.1.1.2 and 4.3.9.1.1.3.”	Revised as requested.
221	4. HQ AETC A7CP	151	4-34	36	Erwin	Change “sites” to “site.”	Revised as requested.
222	4. HQ AETC A7CP	152	4-36	10	Erwin	May occur? Such development is what the PDA is all about! Rewrite.	Revised as requested.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
223	4. HQ AETC A7CP	153	4-37	2	Erwin	Delete “would” between “who” and “live.”	Revised as requested.
224	4. HQ AETC A7CP	154	4-40	Table 4-12	Erwin	Note a, line 4: At end of line, change “rate” to “rates.” Note a, line 5: Add “renovation” between “Non-residential” and “debris rates.” Note b, line 2: Delete “addition” before “additional.”	Revised as requested.
225	4. HQ AETC A7CP	155	4-40 & 4-41	Tables 4-12 & 4-13	Martin/Erwin	Inconsistent. Square footages here should relate to those in Tables 2-2 & 2-4. Hard to see relationship because activities have been re-categorized. Make appropriate changes.	In order to determine which year of construction under the Proposed Action would have the most impact to the landfill we had to separate out the projects by year. In table 4-12, the construction projects include (as mentioned in Note 'B') all Proposed Action construction square footage, plus all "additional infrastructure" square footage, plus all "Removal of Pavement and Roadways" square footage, plus all of the "renovation" square footage except for the fitness center expansion (which is actual renovation). We included asphalt clearing and repaving activities in the construction category because very little waste is generated during these types of activities and of the three rates of debris used for analysis, the construction rate of debris is the smallest. There is not another way to display the table results and still be able to identify how much waste will be generated each year of construction during the Proposed Action. Table 4-13 uses the renovation, demolition, and construction totals from Table 4-12 and then adds the amount of construction square footage associated with broad installation expansion under the PDA. The same rate of debris was used to calculate solid waste generation under the PDA broad installation expansion as was used for the Proposed Action (rate of 3.89 lbs/sf).
226	4. HQ AETC A7CP	156	4-41	7	Erwin	Inconsistent. 459,804 SF doesn’t track with Table 2-4. Make appropriate changes.	The PDA calls for 695,538SF of facility construction. Conceptually, we assume that the PDA includes all of the Proposed Action (PA) projects plus conceptual development beyond the PA. The PA calls for 234,734 SF of construction. Therefore, the resulting amount of additional "conceptual" construction under the PDA is 459,804. It is a little messy to quantify it in this matter but for some resource areas, it must be done to quantify impacts.

Overall Comment #	Original Matrix	Original Matrix #	Page	Line	Reviewer	Comment	Response
227	4. HQ AETC A7CP	157	4-42	20	Martin/Erwin	Is 12.5% significant? If not, what is significant percentage? (What is capacity of drainage system to handle runoff?)	Drainage systems would be upgraded as part of the broad installation expansion under the PDA. Therefore, there would be no impacts to drainage systems under the PDA. Text was revised appropriately.
228	4. HQ AETC A7CP	158	4-43	10-11	Erwin	Disagree with exception. The intensity of activity would be greater, not the duration. Rewrite.	Revised as requested.
229	4. HQ AETC A7CP	159	5-1	--	Erwin	What are “MAG” and “B” degrees?	MAG = Master of Applied Geography "B" was changed to "BS"
230	4. HQ AETC A7CP	160	A-15	--	Martin/Erwin	Were there any scoping responses? Include, as well as any correspondence from consultations with regulatory agencies.	At the point at which the PDEA was published, no scoping letters had been received. Scoping responses will be included in the Draft EA.

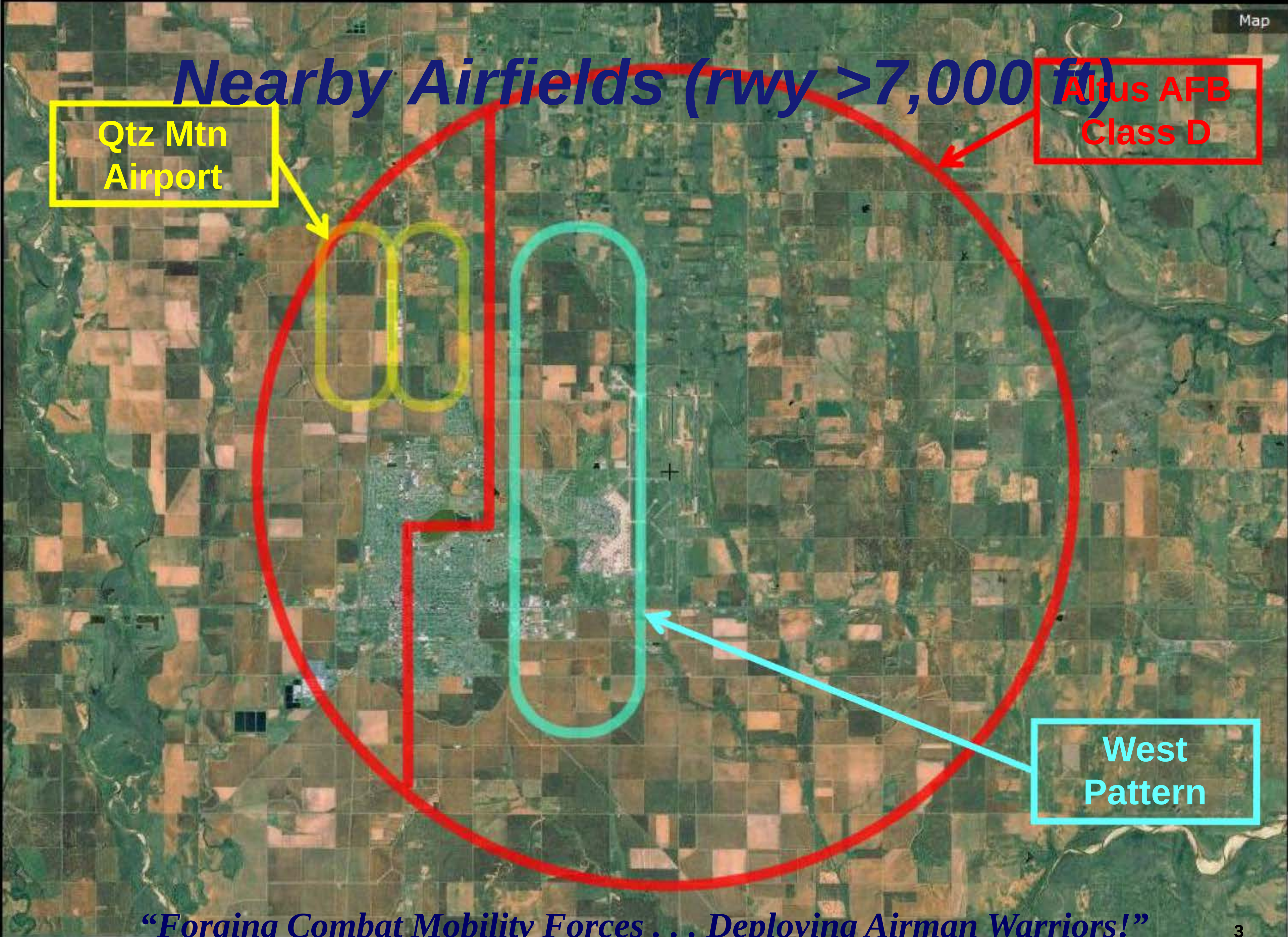
West VFR Pattern

a/o 11 Dec 09

West Pattern Background

- West Pattern has been a consideration since 2003, but no action was taken due to the perceived lack of utility
- In Aug 08, OSS reviewed the proposal and determined that West Pattern could increase pattern capacity by as much as 50%
- To gain consensus, OSS (CC, Airspace Manager, Airfield Ops, and ADOs), met with CES, PA, and the KAXS Airport Director
- Later in Aug 08 test flights were conducted
  - Positives:
    - Validated the West Pattern as a viable option
    - Confirmed noise levels were acceptable
  - Negatives:
    - KAXS Airport Director unhappy with proximity of KLTS jets
    - There were 3 noise complaints
- West Pattern incorporated into GIAP Jan 09

Nearby Airfields (rwy >7,000 ft)



General Plan-Based Impact Analysis Process (GIAP)

- In 2009 a GIAP was conducted at Altus AFB to study impacts of future construction projects
- OSS requested the West Pattern be incorporated into GIAP
  - Study impacts of noise and safety issues associated with KLTS aircraft flying on the west side of the base
- The GIAP, as required by law, went out for public review/comment in Sep 09
  - Three letters were received; all concerned the West Pattern
  - OSS, CES, and the contractor met to address issues brought forth in the letters

Next Steps

- Upon completion of Wg/CC signing GIAP:
  - Negotiate new LOA with KAXS
    - Will they eliminate their East Pattern (pattern alt 1,000’ AGL)?
    - Will we fly at 1,500’ or 2,000’ AGL?
  - For approx 60-day period:
    - Publish local procedures
    - Attain AETC/A3OF approval on the procedures
    - Conduct controller and aircrew training
    - Publish PA announcements prior to implementation
- Fly the West Pattern on or about 1 Mar 10

Questions